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DEVELOPMENT AND VALIDATION OF AN AVIATION RESEARCH SURVEY

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Abstract

Surveys are one of the more commonly utilized data collection instruments in aviation research. Unfortunately, there often is little information provided as to how the surveys utilized in such studies were developed. This is problematic because the validity and construction of surveys are critical to the successful collection of data. Further, without the proper distribution methodologies in place, survey response rates can be poor. This qualitative study provides a literature-based process to assist aviation researchers to design and validate a survey instrument. First a literature-based survey development protocol was developed. Next, a validation process utilizing a panel of experts was created. Panel members were sought with experience and qualifications specific to the subject areas covered in the survey including its (a) construction, (b) implementation, (c) graduate level research, (d) higher education, (e) aviation higher education, (f) the aviation industry, (g) flight instruction and certification, and (h) demographic measures. Interviews were conducted each of the five expert panel members using a semi-structured protocol. The results of the interviews were coded using NVivo qualitative analysis software. The panel members determined that the example survey was a valid instrument to use in an applicable study. A summary of panel member feedback that could be generalized to a wide range of aviation surveys is provided. In summary, through a careful review of available literature and through the conduct of a panel of experts review, an explicit, structured process was fashioned for aviation researchers to use in order to successfully create and validate a survey instrument for use in a variety of studies.

Surveys have been commonly utilized in recent aviation-related research. A review of the two most recent issues of the *International Journal of Applied Aviation Research* (Volume 10, Issue 1; Volume 9, Issue 2), there were 19 articles of which six (31.5%) included the use of a survey. Four of the articles that included a survey (66.7%) had at least one instrument that was designed by the researcher yet no information was provided as to how the instrument was created or what efforts were made to validate the survey. A similar review of the *Collegiate Aviation Review* (Volume 28, Issues 1 and 2) revealed 14 articles of which eight (57.1%) utilized at least one survey. Five of the articles that included a survey (62.5%) had at least one survey that was designed by the researcher, yet no information was provided as to how the instrument was created or what efforts were made to validate the survey. This review of the most recent, available aviation literature

was clearly provides evidence that not only does aviation research regularly utilize surveys, little information is provided as to how the surveys are developed or if they have been validated.

Purpose statement

The objective of this qualitative research study was to determine a literature-based procedure to create an aviation-related survey. An additional objective was to identify a means to validate such a survey. Similar procedural studies have been conducted in a variety of other fields to assist fellow researchers design and implement successful, well-designed studies (Dimitrov & Rumrill, 2003; Onwuegbuzie & Leech, 2007; Peng, Lee, & Ingersoll, 2002). The findings provided here are meant to serve similar purposes for the aviation research community.

Method

The first step of this study was to demonstrate a

survey development and editing procedure through an exhaustive literature review and an analysis of existing instruments designed to study aviation faculty. In addition, a thorough investigation of aviation-specific surveys, forms, and applications was conducted. Once the instrument was refined into a draft form, a qualitative analysis of the validity of the survey was conducted using an interview-based inquiry posed to a panel of experts. The principle source of data for this component was extracted from the transcriptions of expert panel interviews.

Survey Development Process

The step-by-step instrument development process presented by Prochaska-Cue (1988) was utilized to assist in the development of the survey. This process calls for the researcher to:

1. define objectives
2. define the target population
3. review related measures
4. develop an item pool
5. prepare and pilot a prototype (Prochaska-Cue, 1988, pp. 50-51).

Dolezal (1991) provided a similar model for the development of an instrument, though in this case, the author specifically mentions the use of a panel of experts to evaluate the prototype version. Creswell (2003) offers a checklist for the development of a survey instrument which was quite similar to those procedures presented by Prochaska-Cue (1988) and Dolezal (1991). These three processes acted as a model for the development of the survey instrument for this study.

Definition of Objectives.

First and foremost, the objectives of the current study were defined. The goal of this study was to develop a survey instrument to evaluate the career pathways, educational pathways, and demographic attributes of postsecondary professional pilot program faculty members. Before moving forward, however, Creswell (2003) argued that justification should be made to support the choice of the survey method as the most appropriate form of data collection. Thus, a review of the appropriateness of the application of survey methods was necessary.

According to Colorado State University (2008), the survey method is an apposite method when trying to gather attributes of large populations. Also, this method was cited as being suitable for administration to persons scattered geographically. Further, surveys allow for "standardized questions [that] make measurement more precise [... and] ensures that similar data can be collected from groups then interpreted comparatively" (Colorado State University,

2008). In addition, "high reliability is easy to obtain" through the apt use of surveys (Colorado State University, 2008). Ball State University (2008) stated that "surveys are used to: [...] gather information from and about large populations; make comparisons among subgroups of the population [... and] gather statistically representative data." These indications supported the use of survey methods in this study.

Yet, as with all research methods, there are disadvantages associated with the use of surveys. It was therefore appropriate to be cognizant of these issues so that they could be mitigated as best as possible. Colorado State University (2008) identified five primary faults of the survey method:

- Standardization issues
- Inflexibility
- Low response rates
- Recall issues
- Context issues.

Standardization issues stem from the fact that surveys "force the researcher to develop questions general enough to be minimally appropriate for all respondents" (Colorado State University, 2008). In this study, standardization issues were determined not to be a factor as the group was relatively homogeneous in experience and education. Therefore, the survey was found to be suitable for all respondents. The inflexibility of surveys, i.e. that they contain all of the same questions throughout the data collection process, was also deemed not be a factor as consistency. The intention was that the survey would provide a one-time data collection which should not require adjustment during the actual collection process. This was viewed as a desirable attribute of the survey so data was standardized and thus easily comparable.

It was noted that response rates could be boosted through the multiple contact methods, e.g. making four to five contacts through different media channels (email, phone, regular mail), as outlined by Dillman (2007). It was found that much attention must be made by researchers to insure high response rates. This portion of research design should receive large amounts of attention by researchers. Recall issues refers to the ability of applicants to remember details. This survey aimed to collect job-critical and demographic data which were unlikely to be difficult to recall. Lastly, although a survey does not take into account contextual factors like a direct observation would, because of the nature of the data collected, this did not appear to be an issue of concern (e.g. job history and demographic answers would be no different if collected in person versus

via a self-administered survey) (Colorado State University, 2008).

Ball State University (2008) offered additional potential disadvantages. One was that "[s]urveys can be expensive, especially paper surveys that require printing, postage, and processing (Ball State University, 2008)." To circumvent this issue, the internet would be used to deliver the survey and reminders thus reducing the cost for paper and postage. Other drawbacks mentioned included the fact that "important issues can be overlooked on surveys when the questions and responses are predetermined (Ball State University, 2008)." Attempts were made to include the ability for individuals to enter data when one of the responses did not fit their situation by including the phrase "Other (please specify)" as an available answer (Dillman, 2007). Finally, Ball State University (2008) mentioned that the "quality of survey data is (sic) strongly dependent on the survey design." This is precisely why an expert panel was constructed to review the instrument in detail.

Creswell (2003) suggested that the next step be to define the "nature of the survey" as well as the "form of data collection" (p. 155). The survey instrument for this study was cross-sectional, which Creswell defined as a method which all of "the data [is] collected at one point in time" (p. 155) versus a longitudinal-type study. The survey was designed to be self-administered and adapted to an online version for ease of transmission and cost reduction.

Definition of the population.

The definition of the population for this instrument was somewhat complex. The purpose of the instrument was to collect data on the entire population of full-time collegiate professional pilot program faculty, therefore no sampling technique was necessary. Yet many aviation faculty reside in programs that do not identify their educational intentions in a clear manner. As Truitt and Kaps (1995) noted, aviation is a "fragmented and balkanized field of study" (p. 232). Previous studies have classified collegiate aviation programs in a variety of ways. Unfortunately, because of the diverse nature of such programs, as well as the confusing nomenclature used to describe these programs, a specific and clear population definition was necessary to understand the focus of this study. Commonly used terms such as "aviation education" and "non-engineering aviation program" have been used to describe collegiate programs that educate more than just pilots. Previous use of these terms has included programs providing education for careers in (a) aviation management, (b) airport management, (c) air traffic control, and (d) aviation maintenance all of which are beyond the scope of this study (Brown, 2007; Hankins,

2007; Lindseth, 1996).

Johnson (1997) reported that aviation programs identify themselves in a wide range of terms such as (a) aviation, (b) aviation science, (c) aeronautical science, (d) aeronautical technology, (e) aerospace science, (f) aviation technology, (g) aeronautics, and (h) collegiate aviation. Some schools still refer to their programs with the term "airway science" which stems from a Federal Aviation Administration curriculum initiative that no longer exists (Johnson, 1997).

Instead, the term professional pilot program appeared to best describe those collegiate aviation programs that are the focus of this study. Fanjoy (2004) used this term to identify "colleges and universities that offer aviation-related programs designed to develop student aviation competencies in preparation for employment as a professional pilot" (p. 1). Brown (2007) stated that a professional pilot program is a subset of aviation education "that includes all flight requirements for private pilot, commercial pilot with instrument rating, may include multi-engine, and certified flight instructor ratings, and is specifically designed to lead to a bachelor's degree at a four-year institution of higher learning" (p. 10).

This term also fits very well with the definition of "professional baccalaureate academic program" offered by Lindseth (1996) which described "those educational processes designed to provide four years of higher education resulting in a bachelor's degree with skills applicable to a particular occupation" (p. 12). Clearly, students in professional pilot programs are being trained specifically for aircraft pilot positions. Delta State University (n.d.) presented yet another explanation of a collegiate professional pilot program: "for an aspiring pilot, there are many ways to obtain flight training. Likewise, there are plenty of different opportunities for a four year degree. However, the key advantage to training in [this] type of university based system is that these two pursuits are integrated."

Complicating this process is the fact that some faculty are what can be referred to as cross-over types. An example of a cross-over faculty is one who claims residence in an aviation management department, but either part of or all of the course load is in classes that would be best defined as professional pilot program subject matter. Therefore, the study will need to reach out to as many aviation faculty as possible, but will need to have qualifying questions built within the survey so as to eliminate those who do not fit within the population constraints. In sum, a critical component of the final implementation of the project will be

to strictly define and limit the population.

Review related measures.

The next step recommended by Prochaska-Cue (1988) was to research existing instruments. Prochaska-Cue (1988) and Creswell (2003) suggested that literature be accessed to glean appropriate instruments. A general search for faculty survey instruments yielded a large number of tools currently in use by (a) researchers, (b) institutions, (c)organizations, and (d)governments. Interestingly, many larger institutions even conduct their own internal surveys (Minnesota State University – Mankato, 2003; Ohio State University, 2005). A search of the Buros Institute database of Mental Measures initially produced several potential instruments; however, these promising candidates were tailored to specific situations, usually aimed towards psychological screening or research (Buros Institute of Mental Measures, 2004). An examination of *Tests in Print V* brought forth similar results with all measures specifically targeting (a) demographics, (b) faculty, (c) educational history, and/or (d) occupational history were geared towards specific goals outside the realm of the current study (Murphy, Impara, & Plake, 1999).

A broader search yielded a survey of faculty written by the Higher Education Research Institute (HERI) at the University of California – Los Angeles. The HERI Faculty Survey is "based on almost 20 years of research on faculty at the Higher Education Research Institute" (HERI, 2008). Of particular interest was the section of the survey that measures the "time diary for faculty work and life" (HERI, 2008). Specifically, the HERI Faculty Survey provided guidance on the construction of questions on faculty status, demographics, and educational history (HERI, 2004). Also, since the latest version of the HERI instrument was distributed online, the full-scale study facsimile was used to assist in the development of an internet version the instrument developed for this study (HERI, 2007). Although the instrument authors provided little detail on validity and reliability, the Office of Institutional Research and Effectiveness at South Texas College (2005), through an evaluation of the HERI survey at itsr institution, found that "this survey indicates that it is a reasonably reliable and valid indicator."

Perhaps the most compelling reference faculty survey came in the form of the National Survey of Postsecondary Faculty (NSOPF). The NSOPF is "a comprehensive nationwide study of the characteristics, workload, and career paths of postsecondary faculty and instructional staff" (National Center for Education Statistics,

2006, p. 1) which is administered for the U.S. Department of Education National Center for Education Statistics. The NSOPF has been conducted approximately every five years since 1988 (National Center for Education Statistics, 2006). Because of its association with the Federal government and its apparent quality of data, it is one of the most commonly cited instruments in postsecondary faculty research. Therefore, the utilization of the NSOPF in the creation of the survey instrument for this study was further supported by the concept of citation analysis which, according to Meho and Robbin (n.d.), "is one of the most widely used methods in evaluating research performance." The NSOPF questions that fit the needs of the proposed survey concentrated on the areas of demographic data, faculty status, educational history and career history (National Center for Education Statistics, 2004).

From the evidence presented by the National Center for Educational Statistics (NCES), the NSOPF-04 (2004 version) was a reliable instrument. The NCES reported that:

> the temporal stability of a subset of faculty items was evaluated using a reinterview. Of the 26 items evaluated, 15 had percent agreement over 90 percent, 6 had percent agreement between 80 and 90 percent, and 5 had percent agreement less than 80 percent. There were no statistically significant modal differences in percent agreement for any of these items (Heuer, et al, 2004, p. 94).

While no validity data was offered by the NCES for the NSOPF-04, the basis of this instrument was founded upon its earlier versions on which there were extensive analyses of validity and reliability including the NSOPF-93 in which:

> measures of association (chi square, Cramer's V) and measures of inconsistency (percent inconsistent and the index of inconsistency) were used. All statistical tests of validity indicated that the data obtained from the NSOPF-93 instrument provided valid measures of respondent gender, race/ethnicity, employment status andacademic discipline (Selfa, et al, 1997, p. 115).

It is important to note that the latter items happened to be the specific areas targeted in the validity study, i.e. the statement does not insinuate that the rest of the questions were found to be invalid.

For confirmation purposes, the U.S. Census

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instrument was utilized in order to insure the appropriate design of demographic capture questions. Because this instrument was required to comply with the Office of Management and Budget's Federal statistical agency quality guidelines, its use in making significant policy decisions at many levels of government, and the fact that it has been cited in a variety of research, it was deemed an appropriate source for question construction data. Furthermore, the U.S. Census Bureau (2008) stated that they "base[] its information products on reliable, accurate data that have been validated. The Census Bureau assumes responsibility for determining sources of data [...], measurement methods, and methods of data collection and processing for its censuses and surveys."

Of course, career, education, and demographic data were not the only measures that need to be collected in a study of professional pilot program faculty. Aviation specific information was a critical component to the completion of the survey instrument, yet there were no standardized tools for the collection of such data found in the research literature. However, the Federal Aviation Administration (FAA) requires pilots to submit uniform information on its Form 8710-1 Airman Certificate and/or Rating Application (for pilots), Form 8400-3 Application for an Airman Certificate and/or Rating (for non-pilots), and Form 8500-8 Application for Airman Medical Certificate. Aviation certification classifications and demographic inquiries for the current survey were drawn from these sources. In order to insure the capture of military personnel without civilian certifications, questions that address this were added similar to that found in box II subpart B. of the Form 8710-1 (Federal Aviation Administration, 2000; Federal Aviation Administration, 1999; Federal Aviation Administration, 1998). No reliability or validity data were available on these forms, but they have been used to screen airman candidates for certification by a government agency for many years. The form has also been amended to reflect any necessary changes over the years.

To verify that no aviation experience type questions were omitted, the employment applications of ATA Airlines (2000), Midwest Airlines (1998), Northwest Airlines (2000), Pinnacle Airlines (2008), and U.S. Airways (2000) were reviewed. While no validity and reliability measures were available for any of these applications, as Friel (n.d.) noted, employers are best served by amending inadequate employment screening methods. Thus, it was likely that many of these airlines have modified their applications over the years to accurately collect quality information.

Lastly, a complete draft survey was built by the author. This draft instrument was then presented to a panel of higher education administrators and faculty. This process was initiated by sending the study survey to ten individuals via email. Five of these individuals were persons familiar with aviation higher education, while the other five were scattered in various fields in higher education or those with advanced degrees and familiar with survey research. Responses were received from seven out of ten for a response rate of 70%.

Overall, the respondents made positive remarks about the draft survey. Respondents found that (a) the item numbers made sense, (b) the type size was proper and easy to read, and (c) there was no inappropriate vocabulary. There were some identified typographical errors and misspelled words that slipped through the initial editing process. The skip patterns were noted to be clear and easy to follow. Some respondents liked the visual cues to move persons through the survey while one respondent thought they should be removed. Only one respondent thought that questions were sensitive, namely the demographic collection questions, and no cultural barrier issues were identified. The survey was found to be in the appropriate language for the respondents.

As for the length and monotonousness of the survey, there were several comments that the survey was too long. This response was expected as the version of the survey distributed was the pencil and paper type. In terms of monotony, a few respondents noted that the series of questions concerning job history were somewhat repetitive. As a result of the feedback, several questions were eliminated or reworded and the choice to place the final survey online with automated skip patterns was further solidified.

Development of an item pool.

Through an analysis of the aforementioned instruments and input on the initial draft, an updated pool of items was developed to measure (a) demographics, (b) educational history, and (c) career history with special consideration for persons involved in aviation. Questions were first evaluated for their applicability to the collection of necessary data. In order to be retained, items had to be directly linkable to the research questions (see Appendix A) (Creswell, 2003). Next, each remaining question was appraised using the criteria set forth by Dillman (2007). A checklist was developed based on these standards and applied to each question (see Appendix B). Examples of such measures included:

- The use of questions that require an answer

- Questions that do not tax the ability of respondents to recall data
- The avoidance of double-barreled questions
- The avoidance of leading questions.

For the sake of ease in coding and for standardization purposes, close-ended questions were preferred but only when no possible alternative answers were deemed to be available (e.g. gender) (Dillman, 2007). Once a list of questions was compiled, each item was evaluated for simplicity and understandability. The most succinct options were retained.

Preparation of and piloting of a prototype.

Upon completing the collection of the item pool, each question was placed into related category sections for clarity to assist the ease of respondent participation (Creswell, 2003; Dillman, 2007). Four primary sections were created:

- Faculty occupational background
- Faculty education background
- Flight-specific items including questions on military experiences
- Demographic items

Again, the guidance of Dillman (2007) was enlisted in the selection of item order. Questions related most directly to participant occupations, those most likely to be of interest to respondents, were placed at the beginning of the survey. The most sensitive questions, those dealing with demographic attributes, were placed at the end of the survey (Dillman,) .

The evaluation of the prototype version was conducted through the enlistment of a panel of experts. Panel inputs were recorded using telephone and in-person interviews. According to Prochaska-Cue (1988), a panel of experts is an excellent tool to use when developing new instruments, particularly to "establish content validity" (p. 77) and to assess individual questions for their ability to meet the objectives of the instrument. Expert panels were also helpful in "provid[ing] independent review, critique, and suggestions" for surveys (Finley et al., 2003, p. 830). Finch, Begley, Sutherland, Harrison and Collins (2007) affirmed that expert panels also can be used to evaluate the "methodological and practical perspective[s]" (p. 87) of neophyte instruments. These authors recommended collecting "comments on the formulation of specific items, exclusiveness of items, presentation, and wording, and the choice of response options" (Finch, et al., 2007, p. 87). This literature guided the conduct of the consultation of a panel of experts in a review of the survey.

Design of the Panel of Experts

Numerous studies have used expert panels to assist in the development and validation of survey instruments (Dolezal, 1991; Elit & Otchet, 1999; Finch, Begley, Sutherland, Harrison & Collins, 2007; Finley et al., 2003; Giacobbi, Jr., 2002; Masse et al, 1998; Prochaska-Cue, 1988). Expert panels were also used to validate aviation-specific survey instruments by Lindseth (1996) and Luedtke (1993). The procedures utilized by these researchers were adopted to design the panel of experts in this study.

Finley et al. (2003) "suggest[ed] that the panel should be comprised of experts who have a practicing interest in the issue of concern, and that members should be drawn from a broad range of backgrounds" (p. 846). Furthermore, no one on the panel should "have a stake in the outcome of the findings" (Finley et al.; 2003, p. 846). Finley et al. further stated that panel members be selected for their expertise in the subject area of the survey, in the creation of surveys, and in demographic measurement. Umbach (2005) recommended input from persons who are within the "target population" (p. 95). These findings were used to guide the selection of the panel members.

Sampling.

Nonrandom, purposive sampling was utilized in the selection of the panel of experts. Berg (2007) defined this type of sampling as when "researchers use their special knowledge or expertise about some group to select subjects" (p. 44). As Gay and Airasian (2000) noted, "the primary focus in qualitative research is on identifying participants who can provide information about the particular topic [… thus] sampling in qualitative research is almost always purposive" (p. 139). This type of sampling was deemed the most appropriate for the goals of this study.

As Finley et al. (2003) reported that a list of potential panel members should be identified that consists of individuals with critical knowledge and/or skills necessary for adequate evaluation of the survey instrument. Required skills included (a) experience in scholarly research, (b) survey research, (c) general attributes of higher education and faculty, (d)aviation higher education, (e) military service, (f)the flight certification process, (g) recent aviation industry experience, and (h) adequate knowledge on the measurement of demographic attributes.

Potential panel members were sent a formal pre-contact notice (see Appendix C) via email to ask if they could participate. Eight such requests were made. More individuals than deemed necessary for the study were contacted with the belief that not all would be willing or able to take part in this research study. Five individuals responded positively. Panel members were sent a survey package that included a copy of the survey, cover letter, and

instructions (see Appendix D) approximately five days after they agreed to partake in the interview process.

Participants.

The panel of experts utilized to evaluate the survey consisted of five persons selected with the requisite skills and backgrounds needed to adequately evaluate the survey instrument. For the list of panel members and the full description of their backgrounds and qualifications, see Appendix E.

Panel interview instrument.

A semi-standardized interview method was used to query the panel of experts on the suitability of the survey to perform its function. This technique was chosen due to its improved flexibility over the standardized interview. Berg (2007) stated that the semi-standardized interview is:

- More or less structured
- Questions may be reordered during the interview
- Wording of questions is flexible [...]
- Interviewer may answer questions and make clarifications
- Interviewer may add or delete probes to interview between subsequent subjects (p. 93).

Two panel members were interviewed in person while the remaining three were contacted via telephone. The primary reason for the use of telephone interviews was the geographic dispersion of the expert panel members. As Berg (2007) noted, this is an appropriate method when researchers need "the ability to reach widespread geographic areas at an economical cost" (p. 109). The face-to-face interviews were conducted due to the individual's close proximity to the researcher. Both types of interview sessions were recorded using a portable tape recorder that could be connected to the telephone line or used to record live sessions.

To insure quality data collection, an interview schedule (see Appendix F) was developed based upon the guidance in Berg (2007). "The specific ordering (sequencing), phrasing, level of language, adherence to subject matter, and general style of questions" (Berg, 2007, p. 99) were tailored to the fact that all panel members were familiar with aviation, higher education, and each had attained a graduate level education. Berg indicated that there were four primary question types: (a) essential, (b) extra, (c) throw-away, and (d) probing. Essential questions "concern the central focus of the study" (Berg, 2007, p. 100). The majority of the questions utilized in this study

were of the essential type. Each such question was open-ended to prompt as much unbiased input from the individuals as possible. Extra questions were basically reworded essential questions to test for reliability. While questions on the body of the survey were utilized to evaluate their ability to reach the goals of the instrument, an extra question directly addressing this was also asked to confirm panel member agreement with the overall suitability of the instrument (Finley et al., 2003).

Throw-away questions, which "may be essential demographic questions or general questions used to develop rapport between interviewers and subjects" (Berg, 2007, p. 101) were used to precede the primary component of the interview session. This method was used to not only gain insight into the backgrounds and qualifications of the panel members, it was also used to add to the air of openness and candidness of the process. A list of probes, those questions designed to "provide interviewers with a way to draw out more complete stories from subjects," (Berg, 2007, p. 101) were included on the schedule to assist the interviewer as necessary throughout the process. These items came directly from Berg (2007), as well as from other studies that utilized panel of expert interviews (Dolezal, 1991; Masse et al, 1998; Elit & Otchet, 1999; Finch, Begley, Sutherland, Harrison & Collins, 2007; Finley et al, 2003; Giacobbi, Jr., 2002; Prochaska-Cue, 1988).

During the creation of the schedule, careful attention was paid to question formulation and effective communication guidance provided by Berg (2007). The interview process was designed to be as simple as possible for the respondent. Accordingly, "affectively worded questions [...] the double-barreled question [... and] complex questions" were avoided (Berg, 2007, pp. 104-105). Also, per the recommendation of Berg (2007), the schedule was designed to "begin with mild, nonthreatening questions concerning demographic matters" (p. 105). The interview was essentially designed to open up as a conversation between the researcher and the respondent and then move on into the "formal" semi-structured process.

Before beginning the interview process, the schedule was pretested. Berg (2007) stated that "the schedule should be critically examined by people familiar with the study's subject matter [... such as] other researchers" (p. 105). Also, Berg (2007) suggested that the researcher should do practice interviews with the schedule to correct any noted problems. An individual familiar with peer-reviewed research and the subject matter of this study reviewed the schedule. This individual was then interviewed in real-time using the schedule. This provided a realistic

time requirement for the interview that was relayed to panel members in subsequent communications. Some minor wording issues were raised regarding a question in the schedule which was corrected before the actual panel of experts were queried.

Panel interview.

Interviews with panel members were scheduled to take place within 10 days of the receipt of the survey package. Each session took approximately forty-five minutes to complete and was recorded using a portable tape-type system. Upon completion of each interview, the recording was transcribed. Once this was completed, a copy of this transcription was sent to the panel member for their review. This "member checking" was conducted to improve the "trustworthiness, authenticity, and credibility" (Creswell & Miller, as cited by Creswell, 2003, p. 196) of the data. The only inaccuracy noted was an erroneously spoken date describing the occupational history of one of the panel members. This was corrected prior to the analysis of the data.

Ethics

Ethical considerations were considered a priority in the development of this research as participation was not anonymous or confidential. Because of this "study involved publishing information potentially recognizable to others, the subjects need to agree to the release of identifiable information" (Kvale, 1996, p. 114). This fact, in addition to a description concerning what identifying information would be published, were clearly stated in the letter requesting participation. Actual comments by panel members were not tied to the individual; however, their name and qualifications appear in a listing of the panel members (see Appendix E).

Several guiding principles, as outlined by Gwartney (2007), were used to insure the ethical nature of this project. The primary standard used was to "do no harm. Nothing in a [...] survey should cause respondents psychological, economic, or legal harm" (Gwartney, 2007, p. 49). Since respondents were asked to reflect on their opinions concerning survey questions written by the author of this study, there were no harmful effects that should arise from this interaction. Another premise used was that of consent (Kvale, 1996). Each individual was informed that his participation was completely voluntary. Participants were specifically asked if they wanted to participate and were told, in doing so, they were giving their implied consent. This method of consent was drawn from Berg (2007). In addition, no special populations, e.g. children, prisoners, or the mentally handicapped, were used in this

study and therefore no special procedures were necessary to be undertaken (Gwartney, 2007). All research was conducted in accordance with the requirements and standards of the Institutional Review Boards (IRBs) of Rocky Mountain College and the University of Nebraska.

Validity and Reliability

According to McMillan (2004), "the credibility of research depends on quality measurement. If the measurement is not sound, the results are not useful" (p. 136). Clearly, the viability of all research rests upon this premise. The two generally accepted descriptors of research suitability are validity and reliability. Validity is defined as "the extent to which inferences are appropriate and meaningful" (McMillan, 2004, p. 136). Creswell (2003) described that there is a difference between validity in quantitative settings versus qualitative settings, i.e. as found in this study. Validity in the qualitative context is the determination of "whether the findings are accurate from the standpoint of the researcher, the participant, or the readers of an account" (Creswell, 2003, pp. 195-196).

Validation of the survey was conducted using the triangulation method outlined by Berg (2007) and Creswell (1997). Specifically, between-method triangulation was utilized through the construction of the instrument based upon literature review and a review of the instrument by panel of experts. Both of these methods helped to strengthen the content-related validity of the instrument (McMillan, 2004). Validity was further strengthened by the use of "member-checking to determine the accuracy of the qualitative findings through taking the final report [...] back to the participants and determining whether these participants feel that they are accurate" (Creswell, 1997, p. 196). Interviews with panel members were recorded, transcribed and returned to the individuals for their review. The sole anomaly was corrected before data analysis began.

This research closely followed the validation methods outlined by Kvale (1996) for each stage of the interview development and analysis process. During the design phase, significant efforts were undertaken to carefully and logically plan the methods based upon what was found in research literature. Also, ethical concerns were a focus of the researcher with special care to follow what Kvale (1996) described as "a valid research design [that] involves beneficence – producing knowledge beneficial to the human situation while minimizing harmful consequences" (p. 237). While interviewing panel members, the "trustworthiness of the subject's reports" (Kvale, 1996, p. 237) was assured by recording of the sessions. Interview integrity was augmented with procedures laid forth by the

available literature. Transcription was completed verbatim from the recording of the interview sessions assuring "valid translation" (Kvale, 1996, p. 237). According to Creswell (2003), reliability, known as the "stability or consistency of responses [...] play[s] a minor role in qualitative inquiry" (p. 195) thus formal reliability testing was performed.

Delimitations

Delimitations are used "to narrow the scope of the study" particularly when a study tends to "focus on specific variables" (Creswell, 2003, p. 148). Clearly, this study was confined to the interviewing of a limited number of higher education and aviation industry experts who are, literally, scattered across North America.

Limitations

Limitations "identify potential weaknesses of the study" (Creswell, 2003, p. 148). It was assumed that the findings collected via the interview process satisfactorily identified the pertinent errors, omissions, and additions necessary to improve the survey although not all errors or methodological improvements were likely to have been conveyed through the feedback. Also, the interpretation of the interview transcripts through the use of NVivo software was limited by the researcher's expertise in use of the software. Therefore, some concepts may not have been coded properly or at all.

The premise of this particular project rests on the unique inputs and situation developed in this process; however, steps were taken to help mitigate other limitations in the study. The extensive referencing of literature was conducted to best guide the construction and evaluation of the survey instrument. The limits stemming from the use of software were lessened through the use of (a) NVivo tutorials, (b) software help documentation, and (c) the enlistment of a text that specifically focuses on the use of the software.

Although the specific feedback from the panel cannot be generalized to a wide range of surveys, as each is likely to uniquely serve the needs of individual research study, the methods and procedures outlined here can be used in a wide range of research. As such, researchers of any subject would likely benefit from the use of the process outlined in this study.

Data Analysis

The data analysis and interpretation steps described by Creswell (2003) were used to begin the actual examination of the dataset. The first step, "organize and prepare" (Creswell, 2003, p. 191) was conducted as the interviews were completed when the recordings thereof were transcribed verbatim using Microsoft Word software.

For the second step, gaining a "general sense of the information," (Creswell, 2003, p. 191) the resultant transcriptions were audited by listening to the recordings while re-reading the transcript. The transcripts were then sent to the respondents via email or U.S. mail for their review and comments. Once all of the transcripts were complete and feedback was received from the respondents, they were subjected to "a thorough reading and annotating of codable topics, themes, and issues" (Berg, 2007, p. 134). Particular attention was paid to note any "similarities and dissimilarities – patterns – in the data" (Berg, 2007, p. 134).

The third step described by Creswell (2003), "detailed analysis with a coding process" (p. 191) was initially done through systematic indexing based upon the major themes upon which the survey questions were formulated. In order to best organize the data, transcripts were loaded directly into NVivo. During this step of the analysis, the researcher "read all the transcriptions carefully. [... and] jot[ted] down some ideas as they [came] to mind" (Creswell, 2003, p. 192). The most remarkable interview was chosen to be perused first, as recommended by Creswell (2003). Notes were made on developing themes and concepts.

This process was, of course, enhanced through the use of NVivo. This software was used for two primary reasons. One was to help eliminate any researcher bias. And two, the software's ability to organize the data and to be able to identify connections within the data far surpassed the capabilities of the researcher.

Topical Unit of Analysis

Bazeley (2007) stated that "[c]oding in qualitative research, in its simplest sense, is a way of classifying and then 'tagging' text with codes, or of indexing it, in order to facilitate later retrieval" (p. 66). Rubin and Rubin (2005) described coding as a process to identify

> each data unit where the matching
> concept, theme, event, or topical
> marker appears. Coding allows you later
> on to quickly locate
> excerpts from all the interviews [...]
> that refer to the same concept,
> theme, event, or topical marker and then
> examine them together [...]
> Coding allows you to sort statements by
> content of the concept, theme,
> Or event rather than by the people who
> told you the information (p. 219).

It was determined that the most appropriate unit of analysis was the topic (Bazeley, 2007). By using topical unit

analysis, the researcher sought to identify and collect commonalities among the comments of the panel members. The extraction of these topics brought forth the information necessary to improve the survey instrument.

Employment of NVivo Qualitative Data Analysis Software

In order to develop the most impartial analysis of the data, it was determined it was advisable to employ the use of qualitative data analysis software. NVivo was chosen based upon the favorable reports by senior faculty at several higher education institutions, as well as those found among researchers who have used the software. Moreover, the researcher found a variety of texts, literature, and online help documents that assisted with the use of NVivo. Also, Creswell (2003) noted that the use of such software allows researchers "to quickly locate useful quotations and multiple perspectives on a category or theme" (p. 193) which was of particular use in this study.

Once the interview transcripts were completed and verified by the respondents, the transcripts were imported into NVivo from Microsoft Word. The data were then coded based upon specific themes discovered within the transcripts. There did not appear to be any value in dividing or coding the transcripts by individual respondent because this research did not aim to identify differences among particular inputs. Instead, the study was meant to collate the comments and ideas, i.e. topics, that emerged from the interviews. Once the coding process began, NVivo began to indicate connections and commonalities among responses. Coding densities were used to identify such associations.

> NVivo has a multitude of capabilities for organizing data.
> In NVivo, you make a node for each topic or concept to be stored, much like designating a hanging file for each topic.
> What NVivo keeps there, however, are not actual segments of data, but *references* to the exact location of the text that you have coded,

from the source document (Bazeley, 2007, p. 83). At the onset of data analysis with NVivo, only the most basic systematization function, the free node, was used. Free nodes "allow you to capture ideas without imposing any structure on those ideas, so they are particularly useful to use at the beginning of a project" (Bazeley, 2007, p. 32). The primary topics related to the general aspects of the survey such as length, its adequacy, and its necessity were organized into free nodes.

As data were found to be more complex, the use of tree nodes becomes necessary. Such "trees – hierarchical, branching structures in which parent nods serve as connecting points for subcategories or types of concepts" (Bazeley, 2007, p. 83). Because of the rather multifaceted nature of the questions of the survey, a tree node was developed to track the intricacies therein. Still using topics as the units of analysis, the resultant ladder of topics included (a) demographics, (b) educational history, (c) FAA certifications and ratings, (d) institutional data, and (e) occupational history. Subtopics were also built into the tree. For example, under FAA certifications and ratings there were two segments: pilot and non-pilot. While under occupational history there were three: (a) general, (b) military, and (c) postsecondary.

Analysis of Coded Data

Rubin and Rubin (2005) provided guidance on how to best analyze coded data. According to these authors, the goal initially is to try "building toward narratives and description" by "sorting and summarizing" (p. 224). Next, the resultant sorted and summarized data should be combined so that "overlapping parts of a narrative or complementary understandings of a concept is straightforward" (Rubin & Rubin, 2005, p. 228). Clearly, as this research was qualitative in form, "the results will be presented in descriptive, narrative form rather than as a scientific report" (Creswell, 2003, p. 205). Lastly, as Richards and Morse (2007) wisely reminded researchers that it is imperative that participants be protected. Therefore, as promised to the respondents, no quotations or data will be directly tied to the individual.

Findings

The results of this study stemmed directly from the analysis of the interviews that were conducted with each of the five expert panel members. Initially, the findings were constrained within the responses to the interview questions, as well as to comments made towards specific questions. As the data were organized and coded using NVivo, specific topics emerged. Respondent comments on each topic were grouped together for analysis and summary. As the analysis of data progressed further, the relationship of the emergent topics were used to direct the organization of the findings. Coded topics and concepts were then linked to the goals of the study. Because of the complexity of recommended amendments to the survey questions, individual questions were assigned to nodes that described what they sought to answer. Once this was completed, a summation of the requisite changes emerged.

The first question posed to the panel members was designed to explore the overall feeling each participant had about the survey. Other general comments about the survey

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design, such as length and ease of use, emerged through probes during the interview process. In general, the feedback was positive; however, several recommendations emerged from the various discussions. When asked if the survey adequately collects the attributes that best describe the pathways to the professoriate, panel members responded that, in general the survey was complete with minimal need for corrections

When probed about the length of the survey, some concerns emerged that the survey was too long. One respondent stated that it consumed too many pages. Upon reminding the individual concerned about this that the primary format of the survey was to be electronic, he stated he thought the length would be fine under those circumstances. Another panel member said it was a bit long but they felt the electronic version would be better allowing for automatic skip logic. Further into this individual's comments, though, he agreed that with proper introductory letters and follow-up requests, there was a high likelihood of adequate response and completions rates.

In order to identify any other general concerns about the survey, panel members were asked if they had any such comments before going through the actual questions and then again at the end to see if there were any summative observations. The majority of the panel members did not have such remarks. The consensus of the panel of experts was that there were no questions that should be eliminated. Also, only two panel members found that there were no missing items or things that should be added while the remaining members felt that there were no missing measures or questions. Finally, it was also suggested that recommended supplementing the research by collecting resumes and performing a limited number of detailed interviews to further explore the pathways and motivations to pursue them.

While all of the panel members agreed that the survey could adequately collected the pathways professional pilot faculty take to reach their positions in higher education, they each had recommendations on how to improve the survey. Although a significant amount of additional feedback was provided by the panel that was specific to pathways of professional pilot faculty, most of this data is not likely to be applicable to or of interest to researchers wishing to conduct survey inquiries in other subject areas. Therefore only a summary of the most substantive and generalizable findings are provided in table 1. For complete details about this particular survey and the panel member comments, see Ison (2009).

Aviation Research Survey

Table 1

Summary of substantive feedback supplied by the panel of experts

Feedback Subject Area	Recommendations	Adopted in final draft?
Demographics	Use age ranges instead of exact age	Yes
Demographics	Delete "prefer not to answer" for option in gender question	No, did not want to risk incomplete surveys
Demographics	Allow respondent to select more than one race/ethnicity	Yes
FAA Certifications/Ratings	Ask for highest certificate held to avoid confusion for those with multiple certifications	Yes
FAA Certifications/Ratings	Distinguish between pilot and non-pilot certifications/ratings	Yes

Degrees attained	Provide each doctorate degree as a choice for highest degree held, e.g. EdD, PhD	Yes
Occupational History	Ask for length in position in lieu of year so no calculations are required	Yes
Occupational History	Inquire if institution has tenure system	Yes
Occupational History	Inquire if faculty is on tenure track	Yes
Occupational History	Include rank of "visiting"	No, study was interested in resident, full-time faculty only
Occupational History	Include administrative positions of coordinator and chair	Yes
Educational history	Allow answer flexibility by using "degree/certificate"	Yes
Occupational history	Use term "assignment" in lieu of "experience" when asking about aviation-related military job functions	Yes
Occupational history	Distinguish between part-time and full-time aviation occupations	Yes
General	Underline, bold, and/or italics subtle differences in wording among similarly constructed questions	Yes
General	Ask for resumes to be uploaded	No, this was determined to go beyond the scope of the intended study

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Upon reviewing these comments, those that were deemed to be applicable to the proposed use of the study were implemented in the final draft. Whilst the feedback of the panel is generally helpful and suitable, researchers are cautioned to insure that any and all changes that are made to the final draft are aligned with the original goals of the survey and the research in which it is used.

Conclusion

This study had two central purposes. One objective of this study was to determine a literature-based procedure to create an aviation-related survey. An additional objective was to identify a means to validate such a survey. Subordinate to this goal was to gain feedback on amendments that expert panels members believed were necessary to improve the survey. This project successfully met these objectives.

Within this study, a sound, research-based procedure for survey designed was outlined. This should give researchers more information as to how to design their own survey methods studies. Utilization of an organized research design plan can insure a more thorough, smooth study process.

Next, a method to validate a research study was presented. While this expert panel evaluation of the survey was limited in size, the experience and areas of expertise of the panel members provided excellent coverage of subject areas that could improve the quality of the instrument. Each member provided unique perspectives and suggestions that will advance the utility of the survey making it easier for respondents to take as well as for the researcher to extract results from it. With the recommended changes, the expert panel agreed that the survey was a valid measure of the pathways professional pilot faculty take to reach higher education.

As surveys are frequently relied upon for the collection of data in aviation research literature, it is critical that investigators have the best and most comprehensive information as to how to conduct studies using such instruments. Optimistically the methods and procedures presented here can assist aviation researchers develop, validate, and implement successful survey-based studies.

David C Ison has been involved in the aviation industry for over 24 years during which he has flown as a flight instructor and for both regional and major airlines. He has experience in a wide variety of aircraft from general aviation types to heavy transport aircraft. While flying for a major airline, David was assigned to fly missions all over the world in a Lockheed L-1011. Most recently, he flew Boeing 737-800 aircraft throughout North and Central America. His true dream was to become an aviation educator which led him to a position as associate professor of aviation at Rocky Mountain College where he has been working for six and a half years. He also serves as research faculty assisting doctoral learners at Northcentral University. David has conducted extensive research concerning aviation faculty as well as the participation of women and minorities in aviation. His previous work has been published in refereed journals and has been presented at numerous education and industry conferences. David also is regularly published in popular aviation publications such as *Plane & Pilot, Professional Pilot, and IFR Refresher*. His educational background includes a master's in aeronautical science from Embry Riddle Aeronautical University and a Ph.D. in educational studies/higher education leadership/aviation higher education from the University of Nebraska – Lincoln.

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Appendix A

Survey Item Abstract

Research Question Item	Applicable Survey Questions
Educational History	12, 13, 14,15, 16, 17, 18, 19, 20, 21
Occupational History	1, 2, 3, 4, 5, 6, 7, 8, 9, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32
Institutional Data/Classification	10, 11
FAA Certifications and Ratings	33, 34, 35, 36, 37, 38, 39, 40, 41, 42
Demographics	43, 44, 45

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Appendix B

Dillman Criteria Question Checklist

1. Does question require an answer?

2. Do respondents have information to answer?

3. Can respondents accurately recall and report past items?

4. Will respondent reveal data?

5. Will respondent be motivated to answer the item?

6. Will response be influenced by something other than words (e.g. order of items)?

7. Is survey being collected by more than one mode?

8. Are simple words used?

9. Are questions succinct?

10. Are complete sentences used?

11. Are there any vague items?

12. Is "other" an option, if appropriate?

13. Are categories mutually exclusive?

14. Are check all questions avoided unless absolutely necessary?

15. Are questions technically accurate?

16. Double-barreled question?

17. Any objectionable items?

Adopted from Dillman, 2007, pp. 32-78.

Appendix C

Pre-Notice Letter

Dear XX. XXXX,

I am currently in the process of constructing a survey instrument for use in aviation research. The purpose of this survey is to identify the pathways to the professional pilot program professoriate. As part of this process I am conducting a formal evaluation of the survey using a panel of experts. I would like to invite you to be on this panel.

If you agree, I will forward you a copy of the latest version of the survey along with the draft cover letter that will accompany it. I would request that you review the instrument and note any comments, suggestions, etc. that you may have. Please do not worry about remembering what I would like you to do at this point as specific instructions will accompany the aforementioned
documents.

About a week after you receive the instrument (or whenever it is convenient for you), I would like to conduct an interview with you about the survey. This will take approximately 45 minutes. The interview will consist of some general questions about the research project and will then move on to discuss the survey instrument in detail. This interview will be recorded to
insure valid reflections of your input.

Lastly, due to the nature of panel of experts research, your participation will not confidential or anonymous. However, none of your comments or inputs will be directly tied to you within the actual research document (i.e. there will be no quotes citing you as the source). The only place you will be identified will be in a listing of the panel of experts where your background and qualifications are discussed.

Again, thank you for your time and assistance in this project. Due to the lack of information on this niche of the professoriate, it is clearly critical that this data be collected. Your inputs will significantly help this process. If you have any questions or concerns please contact via email
or phone (see contact details below).

Sincerely,

XXXXXX

Appendix D

Package for Panel Members (Instructions and Survey)

Instructions for Evaluating the Survey

First, thank you very much for offering your time and assistance with my project.

You should have received the survey instrument and cover letter with these instructions (in a separate file). If you cannot view these other documents, please send me an email at XXX@XXX or call me at XXX-XXX-XXXX.

STEP ONE: The purpose of this survey is to identify the pathways professional pilot program faculty in the United States take to the professoriate. The term "aviation faculty" is used on the survey to insure faculty in programs that are not named "professional pilot" will still feel included.

Please read through the cover letter and survey, noting any suggestions, comments, etc. For the survey, note any questions that are hard to understand, confusing, or inappropriate. Does the survey appear to measure what it is intended to measure? Also, make note of any questions you think should be added or eliminated. Other items to consider include survey length, question order/organization, and the ease of use of the instrument.

Be aware that the survey will primarily be distributed in an electronic format. Thus, skip patterns and length may vary based on respondent answers. A paper and pencil version will be available to those who prefer this mode or do not initially respond to the electronic form. Finally, an interview format will be used as a last resort method to collect data from non-respondents. Regardless of the mode of distribution, the questions will be the same.

STEP TWO: I will contact you in a few days to arrange a time for the interview component of the survey review. The interview will take approximately 45 minutes. During this meeting, we will talk about the survey in general and then move on to individual questions within the instrument.

This interview will be recorded and transcribed for precision. I will forward a copy of your comments for your review.

Due to the nature of panel of experts research, your participation will not be confidential or anonymous. However, your comments will in no way be tied to you (no direct quotes with you as the source will be utilized). The only place your name and qualifications will appear will be in a listing of the panel of experts in an appendix of the final paper. If this is not acceptable for any reason, please let me know as soon as possible.

Again, thank you for helping. I am looking forward to your input.

XXXXX

XXXX XX, XXXX

Dear XXX,

I am writing to ask for your assistance in a study of full-time aviation faculty members. This study seeks to learn more about the career and educational pathways that have led such faculty to the aviation professoriate.

I am contacting full-time aviation faculty teaching at four-year University Aviation Association (UAA) member schools. It is my understanding that you are a member of this cohort.

Because little research has been conducted specifically on aviation faculty, the results of this study will provide critical insights into who aviation faculty are and how they make their way into academics. This study aims to provide a comprehensive analysis of the characteristics and career paths of aviation postsecondary faculty.

Please be assured that your responses will be kept confidential. The final results of this survey will be a summary of findings in which no individual responses will be identifiable.

Your participation in this survey is voluntary. However, it would be extremely beneficial if you could share your experiences about your path into the aviation professoriate. If you do not want to participate, please return the blank survey in the accompanying stamped envelope.

As a thank-you for your time and effort in completing the survey, I have enclosed a small token of appreciation.

If you should have any questions or comments about this study, I would be very interested in talking to you. Please do not hesitate to write to the address on the letterhead above, call XXX-XXX-XXXX or email XXX@XXX.

Thank you very much for participating in this important study.

Sincerely,

XXXXX

P.S. If you are not a full-time aviation faculty member at a four-year University Aviation Association institution, it would be greatly appreciated if you could simply return the survey uncompleted in the enclosed stamped envelope.

Image from http://www.transglobalaviation.net/avimages/tgacollage.jpg

AVIATION FACULTY SURVEY

Please return your completed questionnaire in the enclosed envelope to:

XXXX, XXXX, XXXX

START HERE:

1. In what year did you begin your first aviation related faculty or instructional staff position at <u>any</u> postsecondary institution?
Do not include time when you were a teaching or research assistant.

_____ Year began first aviation faculty position

2. What is your current academic rank, title, or position?

☐ Not applicable (No formal ranks exist at my institution)

☐ Professor

☐ Associate Professor

☐ Assistant Professor

☐ Instructor

☐ Lecturer

☐ Other Title (Please specify): _____

3. In what year did you start working at the job your currently hold?
Consider promotions in ranks as part of the same job.

_____ Year began current position

4. In what subject area do you <u>primarily</u> teach? *Mark only one.*

□ Air Traffic Control

□ Aviation Management

□ Professional Pilot Education (e.g. flight related
        coursework, ground schools, navigation, etc.)

□ Aircraft Maintenance

□ Avionics

□ Aviation Safety

□ Human Factors/Psychology

□ Meteorology

□ Other (please specify): _____

5. In what other subject areas do you teach? *Mark all that apply.*

□ Air Traffic Control

□ Aviation Management

□ Professional Pilot Education (e.g. flight related
        coursework, ground schools, navigation, etc.)

□ Aircraft Maintenance

□ Avionics

□ Aviation Safety

□ Human Factors/Psychology

□ Meteorology

□ Other (please specify): _____

6. Do you currently have faculty status as defined by your institution?

       □ No

       □ Yes

7. Are you considered a full-time employee of your institution?

       □ No

       □ Yes

8. What is your tenure status at your institution?

       □ Tenured

       □ On tenure track, but not tenured

       □ Not on tenure track, but institution has tenure system

       □ Institution has no tenure system

9. If you are currently acting in the capacity of administrator, which of the following best describes this position?

       □ I am NOT currently acting in an administrative capacity

       □ Department Chair

       □ Dean (include Associate and Assistant)

       □ Provost

       □ Other (Please specify): _____

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10. What is the highest degree that students in your program of study can receive from your institution? *Consider Doctoral Degrees "higher" than First Professional Degrees.*

     □ Doctoral (Ph.D. or Ed.D.)

     □ First-Professional Degree (M.D., D.D.S., J.D., Pharm.D., Psy.D., D.V.M., etc.)

     □ Master's

     □ Bachelor's

     □ Associate's

     □ Other (Please specify): _____

11. What is the highest degree that students in <u>any</u> program of study can receive from your institution? *Consider Doctoral Degrees "higher" than First Professional Degrees.*

     □ Doctoral (Ph.D. or Ed.D.)

     □ First-Professional Degree (M.D., D.D.S., J.D., Pharm.D., Psy.D., D.V.M., etc.)

     □ Master's

     □ Bachelor's

     □ Associate's

     □ Other (Please specify): _____

12. What is the highest degree you have completed?
Consider Doctoral Degrees "higher" than First Professional Degrees.
Do not include honorary degrees.

□ None → (Skip to 21)

□ Doctoral (Ph.D. or Ed.D.)

□ First-Professional Degree (M.D., D.D.S., J.D., Pharm.D., Psy.D., D.V.M., etc.)

□ Master's

□ Bachelor's

□ Associate's

□ Other (Please specify): _____

13. In what year did you receive this highest degree?

_____ Year highest degree received

14. In what field or discipline did you receive this highest degree?

_____ Field or Discipline

15. What is the next lower postsecondary degree that you hold?
Do not include honorary degrees.

□ None → (Skip to 21)

□ Doctoral (Ph.D. or Ed.D.)

□ First-Professional Degree (M.D., D.D.S., J.D., Pharm.D., Psy.D., D.V.M., etc.)

□ Master's

□ Bachelor's

□ Associate's

□ Other (Please specify): _____

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16. In what year did you receive this other degree?

_____ Year degree received

17. In what field or discipline did you receive this other degree?

_____ Field or Discipline

18. What is the next lower postsecondary degree that you hold?
Do not include honorary degrees.

        □ None → **(Skip to 21)**

        □ Doctoral (Ph.D. or Ed.D.)

        □ First-Professional Degree (M.D., D.D.S., J.D., Pharm.D., Psy.D., D.V.M., etc.)

        □ Master's

        □ Bachelor's

        □ Associate's

        □ Other (Please specify): _____

19. In what year did you receive this other degree?

_____ Year degree received

20. In what field or discipline did you receive this other degree?

_____ Field or Discipline

21. Are you currently working on another degree?

□ NO, I am not currently working on another degree

□ YES, a Doctoral Degree (Ph.D. or Ed.D.)

□ YES, a First-Professional Degree (M.D., D.D.S., J.D., Pharm.D., Psy.D., D.V.M., etc.)

□ YES, a Master's Degree

□ YES, a Bachelor's Degree

□ YES, an Associate's Degree

□ YES, another degree type (Please specify): _____

22. Immediately prior to becoming an aviation faculty member, what was your occupation? *If you were in school, please use the term "student" to describe your occupation. If you were self-employed, use the term "self-employed."*

□ None → (Skip to 26)

_____Prior Occupation

23. How long did you work in this occupation?

_____ Years in Occupation

24. Prior to beginning the previously mentioned job, what was your occupation? *If you were in school, please use the term "student" to describe your occupation. If you were self-employed, use the term "self-employed."*

□ None → (Skip to 26)

_____Prior Occupation

25. How long did you work in this occupation?

_____ Years in Occupation

26. How many years have you been employed in or associated with the aviation industry (including higher education)?
Your best estimate is fine.

_____ Years of Aviation Industry Experience

27. To the best of your knowledge, do your career plans include staying in aviation higher education?

□ No

□ Yes

28. Did you serve in the military?

□ No → **(Skip to 33)**

☐── □ Yes
 │
 ↓

29. (If yes) In what branch or branches of the military did you serve? *Mark all that apply.*

□ Air Force

□ Navy

□ Army

□ Marines

□ Coast Guard

□ Other (Please specify):_____

30. Please describe any aviation-related occupation(s) you had while in the military:

☐ None

_____ Aviation-related

_____ Occupations

_____

_____

31. Please list all military flight qualifications that you achieved during your service:

☐ None

_____ Military Flight

_____ Qualifications

_____

_____

32. What was your final military rank?

_____ Rank

33. Do you have any Federal Aviation Administration (FAA) pilot certifications or ratings?

☐ No → **(Skip to 42)**

☐ Yes

34. (If yes) What is the highest level of certificate that you hold?

☐ Student Pilot

☐ Sport Pilot

☐ Recreational Pilot

☐ Private Pilot

☐ Commercial Pilot

☐ Airline Transport Pilot (ATP)

☐ Other (Please specify): _____

35. What category or categories of aircraft are on this highest certificate? *If applicable, mark all of the following that apply.*

☐ Airplane

☐ Rotorcraft

☐ Glider

☐ Lighter Than Air

☐ Powered lift

☐ Powered Parachute

☐ Weight Shift

□ Other (Please specify): _____

36. What class or classes of aircraft are on this highest certificate? *If applicable, mark all of the following that apply.*

　　　□ Single Engine Land

　　　□ Single Engine Sea

　　　□ Multi Engine Land

　　　□ Multi Engine Sea

　　　□ Balloon

　　　□ Airship

　　　□ Helicopter

　　　□ Gyroplane

　　　□ Other (Please specify): _____

37. Do you have an instrument rating?

　　　□ No

　　　□ Yes

38. What type or types of instructor certificates do you hold? *If applicable, mark all of the following that apply.*

　　　□ None

　　　□ Flight Instructor (CFI)

　　　□ Instrument Flight Instructor (CFII)

　　　□ Multi Engine Flight Instructor (MEI)

　　　□ Gold Seal

☐ Ground Instructor (BGI, IGI, AGI)

39. Were any of these certifications/ratings awarded based on military competency?

☐ No

☐ Yes

40. Do you have any aircraft type ratings?

☐ No → **(Skip to 42)**

☐ Yes

41. (If yes) In what aircraft are you type rated?

_____ Aircraft

_____ Types

_____

_____

42. Please indicate any non-pilot Federal Aviation Administration (FAA) certifications that you hold:

☐ None

☐ Flight Engineer

☐ Flight Navigator

☐ Air Traffic Control Specialist, Control Tower Operator or Equivalent

☐ Aircraft Dispatcher

□ Mechanic, Avionics Technician, Repairman, or Equivalent

□ Other (Please specify): _____

43. What is your gender?

□ Female

□ Male

□ Prefer not to answer

44. What is your current age?

_____ Age

□ Prefer not to answer

45. Which of the following best describes your racial/ethnic group?

□ African American/Black

□ American Indian/Alaska Native

□ Asian American/Asian

□ Caucasian/White

□ Mexican American/Chicano

□ Native Hawaiian/Pacific Islander

□ Puerto Rican

□ Other Latino

□ Other (Please specify): _____

□ Prefer not to answer

END.

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THANK YOU AGAIN FOR PARTICIPATING.

Thank you for your time and effort to complete this survey. If you have any further comments about your experiences or about this survey, please use the space provided below.

If you would like a copy of the results of this study please check here: □

For assistance with this survey, please call XXX-XXX-XXXX or email XXX@XXX

Please return your completed survey in the envelope provided to:

XXXX, XXXX, XXXX

Appendix E

List of Panel of Experts

- Dr. Barbara Vail, Associate Academic Vice President, Professional Studies Division Chair, Professor of Psychology, Rocky Mountain College

Dr. Vail is the Associate Academic Vice President at Rocky Mountain College and has been in this position for over a year. She has also been an academic division chair for over eight years. Dr. Vail's oversees the aviation department at the institution and is familiar with Aviation Accreditation Board International (AABI) standards, Federal Aviation Administration Part 141 training, as well as aviation faculty qualifications and experience. She has a PhD in experimental psychology and has been teaching assessment and survey coursework for over 20 years. Dr. Vail also serves a principle role on the Institutional Review Board at Rocky Mountain College.

- Dr. Allen Hamilton, Line Pilot/Captain, Federal Express

Dr. Hamilton is a recent graduate from the University of Nebraska doctoral program. He graduated from the educational leadership and higher education program with a specialty in aviation education. Dr. Hamilton also has a master's in aeronautical science from Embry-Riddle Aeronautical University. He is currently a captain for Federal Express serving on the Airbus 310. Dr. Hamilton has been flying commercial aircraft for over 30 years. He has an Airline Transport Pilot, flight engineer, flight instructor, and instrument flight instructor certifications. He is also has airframe and powerplant certification. Dr. Hamilton is type rated in the Boeing 747, McDonnell Douglas MD-11, Airbus 300 series, Boeing 757/767, and the Boeing 727. He was also in the Navy for a brief period.

- Dr. Marilyn Grady, Professor of Educational Administration, University of Nebraska – Lincoln

Dr. Grady has been in the Educational Administration department at the University of Nebraska – Lincoln for 23 years. She has been the department chair of a similar program and was also an administrator for the College of Medicine at the University of Illinois Champaign-Urbana. Prior to that she worked as a K-8 principal and was an assistant high school principal. She also gained experience with faculty development while working in such a capacity at the Ohio State University dental college. She has taught and currently does teach survey methods of research. She has written 23 books, with two more in press. She has also had 175 refereed journal articles published throughout her career.

- Dr. Henry Lehrer, Visiting Professor of Aviation, Southern Illinois University; Visiting Professor and Academic Coordinator of the Master's of Business Administration for Aviation Professionals, Daniel Webster College

Dr. Lehrer served in the Army for three years in a non-flying role. He got his private pilot's license and completed his commercial multi-engine and flight instructor ratings through the GI Bill. He then became a professor of aviation at Bowling Green State University where he eventually ran the program and served as the chief flight instructor. Around the same time, he was doing some corporate flying. Dr. Lehrer then went to Embry-Riddle Aeronautical University – Daytona Beach to serve as an aviation faculty member. Around ten years ago, he moved to the University of Nebraska – Omaha to work in the Aviation Institute. Thus for over 28 years, Dr. Lehrer has been involved in aviation higher education. He also has extensive flight instruction and FAR Part 141 experience.

- David Kimball, Professor of Aviation – Emeritus, Rocky Mountain College; Director of Aviation (Retired), Rocky Mountain College

Mr. Kimball went through Air Force ROTC in college and obtained his private pilot license before graduation. He then went on into pilot training in the U.S. Air Force. He spent 30 years in fighter aviation and command positions. He was an Air Force flight instructor and accumulated more than 3,000 hours of military flying time. He was also base commander for a large military installation for several years. After retiring from the Air Force, he served as the Director of Aviation at Rocky Mountain College. He received his FAA instrument, commercial, and flight instructor certifications/ratings through a local flight school.

Appendix F

Interview Schedule

Thank you for helping me by sharing your views concerning the survey instrument to collect professional pilot program faculty career and educational backgrounds.

This interview process does not have any known harmful effects. Benefits of the process include the potential improvement of the survey you received which will lead to a better understanding about aviation faculty. Your participation in this process is completely voluntary. By agreeing to complete this interview process, you are implying your consent to participate. Does this meet with your approval?

Good.

Just as a reminder, I am recording our interview session and it will be later transcribed verbatim. Following the interview I will email you a copy of this transcription for your review.

Is this acceptable to you?

Thank you!

What I am interested in learning during this interview process is your expert opinion concerning the ability of the survey you reviewed to identify potential paths professional pilot faculty take to get into higher education in addition to the basic demographic attributes of these individuals.

Please give me as much detail about your feelings, experiences, and suggestions as you are willing to offer. I am very much interested in your thoughts, ideas, and perspectives. I will begin first with some general questions about you and then the survey instrument. From there we will go through the survey to talk more about individual questions.

Before we begin, do you have any questions?

So you are ready to start?

What is your name?

What is your current/previous occupation?

Could you briefly describe your aviation/higher education/survey background? (Degrees, education, flight background, military, survey background, etc.)

Do you believe that this survey is necessary to adequately describe the pathways professional pilot faculty take to reach their positions in higher education?

Do you believe that this survey adequately collects the attributes that best describe these pathways?

What did you think about the length of the survey?

I would like to now go through the survey questions. As we go through the survey, I would also like you to tell me everything you are thinking about or feeling as we go through each question. This thinking aloud process is a common technique in testing surveys so as to make them easier to use and to make them better in general.

As we progress, let me know if there is anything that you like or dislike about the questionnaire. I am particularly interested if you feel that an item should be included, revised, or removed from the survey.

Okay so let us begin with the first part of the survey.

Is it clear where to begin?

Okay. Let's take go through the first question. (Read through questions/or go through notes)

Probes:

       Could you tell me more about that?

       Why would you exclude the question?

       What would you suggest to improve/replace the question?

       What exactly do you dislike about this question?

Finally, did you find any of the questions confusing?

Was any of the wording vague or hard to understand?

Do you have any more comments?

Any questions for me?

Well, thank you very much for your time. I really do appreciate it. I will transcribe this session soon and then forward you a copy for your review.