QUALITY INDICATORS FOR COLLEGIATE PROFESSIONAL PILOT TRAINING PROGRAMS: A DELPHI STUDY

By

DOVIE (DEE) M. BROWN

Bachelor of Business Administration
University of Central Oklahoma
Edmond, Oklahoma
1975

Master of Natural and Applied Sciences
Oklahoma State University
Stillwater, Oklahoma
2000

Submitted to the Faculty of the
Graduate College of
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
May, 2007

QUALITY INDICATORS FOR COLLEGIATE

PROFESSIONAL PILOT TRAINING PROGRAMS:

A DELPHI STUDY

Dissertation Approved:

Lynna J. Ausburn
Dissertation Adviser

Mary J. Self
Committee Member

Mary N. Kutz
Committee Member

Charles Robert Davis
Committee Member

A. Gordon Emslie
Dean of the Graduate College

TABLE OF CONTENTS

LIST OF TABLES

Tables Page

LIST OF FIGURES

Figure Page

NOMENCLATURE

99s	Ninety-Nines – an international organization of women pilots founded in 1929 by 99 licensed women pilots for mutual support and advancement of aviation
AAAE	American Association of Airport Executives
Advisory Circular	Publications intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material
AFD	Airport Facility Directory – a publication listing information of operational importance about airports including communications data, navigation aids and special notices and procedures
AHP	Alpha Eta Rho – international collegiate professional aviation fraternity established in 1929
AIAA	American Institute of Aeronautics and Astronautics
AOPA	Aircraft Owners and Pilots Association
Avionics	The electronic instrumentation and control equipment used in airplanes and space vehicles
CRM	Crew Resource Management – aviation training that encompasses a wide range of knowledge, skills, and attitudes including communications, situational awareness, problem solving, decision making and teamwork; CRM is primarily concerned with making optimum use of all available resources both technical and non-technical
DME	Distance Measuring Equipment – provides accurate and continuous monitoring of correct progress on the ILS to the pilot

DUATS	Direct User Access Terminal Services – a weather information and flight plan processing service contracted by the FAA for use by U.S. civil pilots
EAA	Experimental Aircraft Association
FAR Part 61	Federal Aviation Regulation that prescribes the requirements for issuing pilot, flight instructor, and ground instructor certificates and ratings
FAR Part 141	Federal Aviation Regulation that prescribes the requirements for issuing pilot school certificates, provisional pilot school certificates, and associated ratings
FAR Part 142	Federal Aviation Regulation that prescribes the requirements governing the certification and operation of aviation training centers
FBO	Fixed Base Operator – a service center at an airport offering a variety of services such as refueling, aircraft rental, deicing, aircraft towing, etc., and which may include flight training as a service
FITS	FAA-Industry Training Standards – a program partnership between FAA, Industry, and Academia designed to enhance general aviation safety by developing flight training programs that are more convenient, more accessible, less expensive, and more relevant to today's users of the National Airspace System
GPS	Global Positioning System – a satellite navigation system transmitting signals to a receiver to determine the receiver's location, speed, and direction
ILS	Instrument Landing System – an instrument approach system which provides precise guidance to an aircraft approaching a runway
MAAP	Multicultural Association of Aviation Professionals
NAFI	National Association of Flight Instructors
NDB	Non-Directional Beacon – a radio broadcast station used as an aviation or marine navigation aid (less sophisticated than VOR)
NIFA	National Intercollegiate Flying Association

NOTAM(s)	Notice to Airmen – an announcement issued by aviation authorities to alert aircraft pilots of any hazards en route or at a specific location
PAMA	Professional Aviation Maintenance Association
POI	Principal Operations Inspector – an FAA designated Aviation Safety Inspector experienced in piloting and management in FAA Part 121, Part 135, and/or Part 141 operations
TSA	Transportation Security Administration – a component of the Department of Homeland Security, formed following 9/11 and responsible for security of all the nation's transportation systems
UAA	University Aviation Association – the voice of collegiate aviation education educators, industry, government, and the public in advancing degree-granting aviation programs for all segments of the aviation industry; originated the movement for curricula accreditation of aviation training programs that eventually resulted in the formation of the CAA (1992), now the AABI.
VOR	VHF Omni-directional Range – a type of radio signal navigation system for aircraft
WIA	Women in Aviation International

CHAPTER I

INTRODUCTION

Background

According to the Aircraft Owners and Pilots Association (AOPA), there are more than 200 institutions that offer aviation majors: 93 offer bachelor's degrees and 112 offer associate (two-year) degrees (Kitely, n.d.). In the United States and Canada, there are approximately 114 educational institutions at the two-year and four-year level that offer professional pilot training as an area of specialization (University Aviation Association, 2004). However, within the field of aviation in the United States there are no commonly agreed-upon characteristics that are identified with exceptional professional pilot training programs. A cursory review of the literature revealed that standards exist for institutional accreditation, such as the National Council for Accreditation of Teacher Education (NCATE) and the North Central Association of Colleges and Schools (NCA). Within the field of aviation education, the Council on Aviation Accreditation (CAA) is a nonprofit organization that sets standards for aerospace programs taught in colleges and schools around the United States and Canada. The CAA adopted as one of its goals for collegiate aviation accreditation the

establishment of uniform *minimum* educational quality standards (CAA Form 101, p.6). Although the CAA standards afford certification of professional pilot programs under its Flight Education option, the minimum standards are below what some programs at four-year institutions aspire to reach and maintain. For example, this position has been voiced by several aviation educators at Oklahoma State University (OSU). Specific programs within a subject area, such as professional pilot training, do not necessarily address the specific characteristics that actually define a top-rated program, particularly within the aviation field. Further, in light of the occurrence of September 11, 2001 and the averted British terrorist plot of August 2006, public concern for air safety has caused a greater awareness of the need for accountability. These factors provided the researcher with the impetus to conduct this study.

This study was specifically designed to determine the quality indicators of an exceptional professional pilot flight training program in higher education as perceived by professional aviation educators. Establishment of such a set of quality indicators could prove useful for future development of a rating and/or ranking system for professional pilot training programs in colleges and universities and for raising the overall quality of these training programs.

Theoretical and Conceptual Framework

The theoretical support for this study was derived from the concept of Total Quality Management (TQM) principles. TQM was the quality business strategy put forward by W. Edwards Deming and Joseph Duran as a philosophy for the successful development, use, and maintenance of all aspects of an

operation in order to achieve excellence. TQM was the precursor to many quality initiatives and helped lay the foundation for other concepts such as best practices and benchmarking.

Standards

In a contemporary world setting, standards exist which are unique in many realms such as business, industry, education, health care, environmental, and others. According to one dictionary definition of "standard," a standard is "something considered by an authority or by general consent as a basis of comparison; a rule or principle that is used as a basis for judgment" (*Webster's College Dictionary*, 1995, p. 1303). For example, in education, standards make it possible for the public to see what schools are trying to teach and what students are being required to learn. Regardless of the domain, standards exist for a variety of reasons: to provide focus, promote consistency, improve performance, increase credibility, and ensure success (Schray, 2006).

The use of standards has a clear history in business and industry to guarantee the consumers of products and services that certain levels of reliability, safety, efficiency and interchangeability are present. As far back as medieval Europe, craftsmen and merchants organized into unions called guilds, for the purposes of ensuring that guild members maintained standards for product and service quality. The common practice of placing a special mark or symbol on the items produced attested to the guild member's responsibility to satisfy the consumer and uphold the standards of the guild. This approach to sustaining manufacturing quality through applied standards remained essentially

the same until the early nineteenth century and the beginning of the Industrial Revolution (American Society for Quality, 2004).

With the onset of rapidly changing technology during the 1980s came the realization that improvement in internal business processes was necessary to assure long-term survival and growth in a global market (Camp, 1995). In order to identify the best practices of their competitors, businesses began to use standards or benchmarking as a way "to determine who else does a particular activity the best and emulating what they do to improve performance" (Blakeman, 2002, ¶ 1). It is a premise of this study that standards or benchmarks exist within the field of professional pilot training, that these standards can be identified by professionals in the field, and that identification of these standards can be beneficial to the field.

Best Practices

Using benchmarking to identify best practices, businesses were able to systematically arrange or codify standards in a given area and to identify effective professional practices frequently referred to as "best practices."

Common throughout the literature is the notion that there is no universally accepted definition of best practice (Agur, 2006; Maire, Bronet, & Pillet, 2005). However, according to Sacket, Rosenberg, Gray, Haynes and Richardson (1996), there are several themes that run through all of the definitions: "The practice must demonstrate success or have an impact, and the practice must be able to be replicated" (¶ 9).

Buyukozkan and Maire (1998) offered one definition of best practices as "those techniques the best companies have adopted to achieve superior results" (p. 101). Ultimately, best practices are primarily designed and implemented to assure operational and organization success (Agur, 2006). In the field of education, Krueger (1993) identified best practice as answering the question of how to improve teaching and learning in higher education. The federal government also publishes best practices for use in health delivery, highway construction, welfare reform and education initiatives (Patton, 2001).

Benchmarking was the first process that involved looking outside the organization to identify best practices by comparing performance measures with other organizations that perform the same duties or processes. Recently, quality indicators of best practices have been useful to help benchmark best practices in Web-based nursing courses (Billings, Connors & Skiba, 2001), in programs for students with handicaps (Kleinert, Smith & Hudson, 1990), in healthcare performance (Czarnecki, 1996; Higgins, 1997), and in assessment of educational improvement (Highett, 1994). Similar efforts have not been made in professional pilot training programs. Therefore, this study proposes that identification of a set of quality indicators for professional pilot training programs could assist in the development of benchmarks for best practices in aviation education. Further, identifying quality indicators could be useful for future development of a ranking system for professional pilot training programs in colleges and universities. This study assumed the existence, identifiability, and efficacy of best practices or quality indicators for collegiate professional pilot training programs. It sought to

identify quality indicators as perceived by professionals in the field and present these perceptions in a best practices model.

Statement of the Problem

Aviation education programs that offer professional pilot training vary from institution to institution, and the cost associated with this training is high. Hourly costs for flight training range from $70 to $160 per flight hour depending on the type of aircraft being used. It is not uncommon for professional pilot students to invest up to $30,000 over and above regular college tuition in order to meet the degree requirements of a professional pilot program at a four-year university. Students as consumers seek to obtain the best value for their money and must choose between programs offered at various institutions. Without a common understanding of what constitutes an exceptional professional pilot training program, students have no basis for justifying comparison among institutions. In addition, aviation educators are faced with the task of convincing prospective students that their programs are good and meet the needs of the aviation industry. This is difficult without identified quality indicators to serve as benchmarks and bases for comparison. Therefore, the problem for this study is lack of available information to answer the question: "What do aviation educators at four-year institutions perceive to be quality indicators for an exceptional professional pilot program in higher education?" The findings of the study could be useful in eventually developing criteria for rating professional pilot programs and could assist in the development of standards for those programs.

Purpose of the Study

The purpose of this study was to describe the quality indicators that identify an exceptional collegiate professional pilot program as identified by a panel of experts in aviation education.

Research Question

The following question guided this research:

What are the perceived quality indicators that identify an exceptional professional pilot program in higher education in the following areas:

1. Facilities
2. Equipment and technology
3. Faculty
4. Flight/Administrative/Staff Support
5. Government (FAA) compliance
6. Student organizations
7. Completion rates
8. Assessment/Evaluation
9. Curriculum and instructional delivery
10. Miscellaneous

These areas were derived from aviation-related literature, CAA accreditation guidelines, and FAA regulations.

The research question was addressed by using the Delphi technique to collect and converge the opinions of experts regarding quality indicators for collegiate professional training programs. Comments were solicited from a panel

of experts consisting of aviation educators from 4-year institutions who had been nominated by their peers and had met the criteria for participation. The typical Delphi technique involves three rounds of surveys. The first round input asked panelists to state their perceptions of quality indicators in nine specific categories and one miscellaneous category. Responses to the first round of input were analyzed and synthesized using the constant comparison method. The constant comparison method was used within and between the categories. The resulting statements were provided as feedback to the panelists. In round two, panelists were asked to rate and rank both the categories and the comments within the categories. The top eight to ten comments within each of the categories were provided as feedback in round three and panelists were asked to complete a final rating and ranking to identify perceived importance of both criterion categories and items within each category.

Population and Sample

The Delphi technique utilizes a non-random sample of expert panelists. In the Delphi, the expertise of the panel is more important than its representativeness (Ausburn, 2002). For the purposes of this study, heads of aviation departments with professional pilot training programs at 58 institutions of higher education across the United States were identified as the population and were requested to nominate potential participants as panel experts based on specific criteria provided by the researcher. The potential participant pool included 37unique nominations. To maintain both expertise and representativeness of the panel, all 37 nominees were requested to participate in

this study. The volunteer sample agreeing to participate totaled 13 panelists representing 11 states within the continental United States.

Assumptions and Limitations

For purposes of this study, the following assumptions and limitations were accepted:

1. It was assumed the panelists who participated in the Delphi responded honestly.

2. It was assumed the panelists, who were recommended by their professional peers, had expertise to identify quality indicators accurately.

3. The time restrictions imposed on the panelists to respond may have resulted in some panelists dropping out before completing all three rounds of the Delphi, which may have biased the data.

4. There was a possibility that the qualitative, open-ended input provided by the panelists was misinterpreted by the researcher.

Delimitations

Delimitations of the study included:

1. This study did not develop or propose a formal set of standards for assessing professional pilot training programs. It was limited to identifying the quality indicators that were perceived by peer-identified aviation experts to characterize an exceptional professional pilot training program. These indicators might or might not be adopted by individual institutions, but they might be used by the profession in the future to develop formal program standards.

2. This study did not include panelists from non-educational organizations. Thus, findings are not generalizable or applicable to other sectors.

Definition of Terms

The following definitions were applied in this study to provide, as nearly as possible, clear and concise meanings of terms:

Conceptual Definitions

Aviation education – a program designed to prepare students for careers in the aerospace industry in commercial aviation and related businesses as FAA-certified pilots, fixed-base operations managers, airport managers, airline management personnel and other positions in the aviation industry (adapted from Oklahoma State University Catalog, p. 118 and Ohio State University, Assessment Report, p.1).

Professional pilot program – an option 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 (adapted from Oklahoma State University Catalog, p. 118).

Delphi study – a technique for eliciting and refining the perspectives of a homogeneous panel of experts through several rounds of questioning with controlled feedback (Lindstone & Turoff, 1975; Turoff & Hiltz, 1995).

Constant comparison method – an analytical strategy that involves taking one piece of data (one statement, one theme, etc.) and comparing it with all

others that may be similar or different in order to develop conceptualizations of the possible relations between various pieces of data (Thorne, 2000).

Operational Definitions

Delphi panel – a purposively selected panel of 13 aviation experts consisting of aviation educators at four-year institutions who have a minimum of five years of university experience in a professional pilot training program, and who were identified by their professional peers as having expertise to represent the aviation field.

Delphi instruments – the three iterative questionnaires administered to the panel of aviation experts.

Quality indicators – the characteristics of exceptional collegiate professional pilot programs as identified by the Delphi panel in 10 categories:

1. Facilities
2. Equipment and technology
3. Faculty
4. Flight/Administrative/Staff Support
5. Government (FAA) compliance
6. Student organizations
7. Completion rates
8. Assessment/Evaluation
9. Curriculum and instructional delivery
10. Miscellaneous

Sigma rank score (ΣRank) – the total of a Delphi item's raw rankings.

Sigma rank point score (ΣRankPoint) – the point values assigned to summed rankings of Delphi items by reversing ranks and point values (e.g., rank 1 = 10 points, rank 10 = 1 point) so that higher ranked items have more points.

Tier analysis – the identification by major break points in the ΣRankPoint scores of Delphi items and the point ranges within and between each tier level.

Rating – a numerical indication of perceived importance for Delphi items from 1 to 5 with rating 1 as "not important; 2 as "somewhat important; 3 as "moderately important; 4 as "important"; and 5 as "very important."

Ranking – a numerical score of Delphi items for relative importance among items, with rank 1 being the most important to rank *n* being least important.

Significance of the Study

Within the field of aviation there are no agreed upon or recognized qualities and elements that are identified with exceptional aviation programs. The researcher has served on the Aviation Advisory Council for the past five years, and during this time board members from various institutions and private industry have expressed concern about the curriculum at Oklahoma State University, the quality of the students being trained, and whether the students are meeting the needs of 21st century aviation. This concern has been specifically geared toward the preparation of students in the professional pilot degree program. This research provided a description of quality indicators that knowledgeable aviation educators believe characterize an exceptional

professional pilot program at four-year institutions. The results of this study could serve as the basis for development of standards, strengthening of training programs, and eventual development of an assessment tool for professional pilot training programs in four-year institutions.

CHAPTER II

REVIEW OF LITERATURE

Quality Standards and Best Practices in Business and Industry

Historical Perspective

The early twentieth century gave birth to the idea that quality was relevant for the manufacturing processes that create consumer products. Business and industry needed quality standards in order to create a common understanding or meaning and to enhance levels of competence as a way to promulgate best practice or accreditation (Skyrme, 2002). Kujala and Lillrank (2004) stated that the quality movement originated with the statistical quality control (SQC) of manufacturing processes, commonly known as quality control. According to the American Society for Quality (2004), statistician Walter Shewhart for Bell Laboratories originated the concept of controlling all the activities or "processes" that are essential to the quality of the final product.

After World War II, the Japanese aggressively adapted the Total Quality Management (TQM) principles developed from the quality management model advocated by American experts W. Edwards Deming and Joseph Duran. The Japanese took TQM a step farther and developed a quality business strategy called "kaizen" which literally means "change" and "good or for the better."

For the first time, all levels of the organization and not just management emphasized quality.

In response to the success of the Japanese in the global marketplace, the United States government created the Malcolm Baldrige National Quality Award in 1987 to help revitalize the economy. The award established criteria for excellence in business performance based on Japanese quality management practices and provided applicants with self-assessment and improvement tools. The award process also set up criteria to help improve performance practices and to facilitate communication and sharing of best practices among U.S. organizations of all types (Baldrige National Quality Program, 2006).

Beginning in 1981, in an effort to improve organizational performance, Motorola Incorporated combined the concepts of TQM and SQC to develop target performance measures called Six Sigma™. By combining quality management principles with statistical analysis, Motorola succeeded in improving the company's operational performance and in identifying and preventing defects in manufacturing and service-related processes (Vitalo, 2005). Motorola received the first Malcolm Baldrige National Quality Award in 1987 for its quality efforts.

During the 1980s, the methods used in TQM to analyze internal business processes proved too slow to keep up with external business competitors (Blakeman, 2002). As a result, benchmarking became the first process that involved looking outside the organization to identify best practices by comparing performance measures with other organizations that perform the same duties or

processes. Buyukozkan and Maire (1998) referred to benchmarking as a comparative analysis conducted to measure the gap between an organization's current performance level and what other organizations do better. Weller (1996) described benchmarking as "competitive intelligence gathering" that allowed one organization to understand how another organization's best practices contributed to exemplary performance (p. 24).

Best Practices: What Does It Mean?

With the emergence of a global economy, business and industry have come to value "intellectual capital" as that knowledge which can provide an organization with a competitive edge in the marketplace (Patton, 2001). To further show how the application of best practices becomes an integral part of intellectual capital, Patton outlined a chronology of capitalist economic evolution (Figure 1).

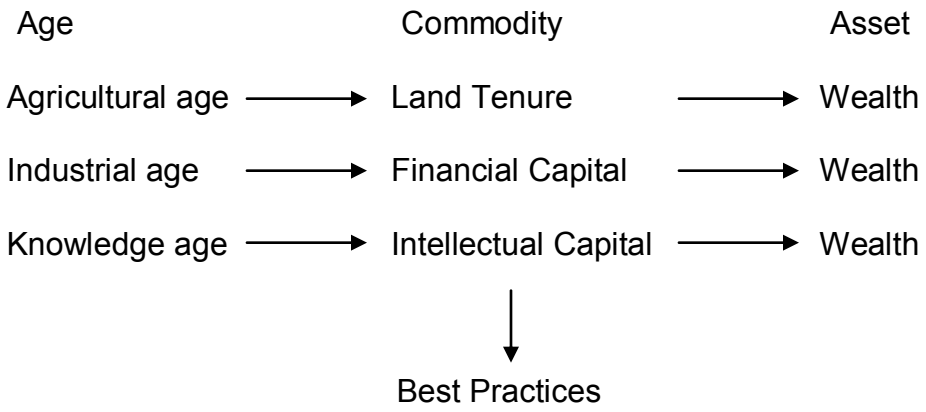


Figure 1. *Intellectual Capital as Best Practice*
Based on *Evaluation, Knowledge Management, Best Practices, and High Quality* by Michael Q. Patton, 2001.

As businesses focused on intellectual capital to increase productivity and spur innovation, they looked to best practices as a form of knowledge having the potential to impact success. By looking at other winning organizations and adapting their proven practices, businesses hoped to improve their own performance. In other words, identifying best practices can make process improvement possible without having to "reinvent the wheel" (Elmuti & Kathawala, 1997). Camp (1989) further defined best practices as those "that will lead to the superior performance of a company" (p. xi). Davies and Kochhar (2002) described best practices as "Those that lead to improvement in performance. That is, they help a low performing company become a medium performer, a medium performer become a high performing company, and a high performer stay successful" (p. 302). Thus, best practice is most often associated with higher levels of performance.

Pursuing best practices by looking outside an organization for process and performance improvements can also show a company different ways of thinking that shed new light on old processes. Hiebeler, Kelly and Ketteman (1998) stated the purpose of best practices is to "disturb you with new ideas and insights. We mean 'disturb' in a positive way" (p.28). For example, a similar or familiar process viewed without bias to the past may have a unique application other than its current use. Therefore, a different perspective has the potential to be a catalyst for growth, in terms of both customers and profitability. Higgins (1997) described best practices as representing "innovative practices that contribute improved performance through leadership and shared vision,

customer focus, knowledge of best practices, resources and support systems, innovative human resource management, work organization, and effective and strategic external relationships" (p.61).

Businesses may increase opportunities for identifying and implementing successful best practices by maintaining close communications with customers to identify and understand what they want and how they define quality (Blakeman, 2002). Just as organizations are dynamic in nature, the techniques identified as best practices are also dynamic and can be an indicator of changing customer demands. Blakeman (2002) reported that best practices perpetually evolve with changes in customer expectations, as well as improvements in the general knowledge base. Staying attuned to current trends in the marketplace and implementing timely changes to best practices may provide the competitive edge that differentiates the winners from the losers.

In summary, best practices means that organizations have evolving standards, know their customers' needs, and are willing to make the effort to continuously search for ways to improve processes and performance.

Best Practices: How Are They Useful?

Best practices that are highly respected often become a synthesized framework or codification of standards. For example, ISO 9000 quality standards have evolved over the past decade (Skyrme, 2002). ISO quality standards helped establish compatibility and interchangeability, particularly among manufactured components. Adherence to common standards enhanced efficiency and allowed for the application of proven practices to new situations

and/or organizations. Through the use of standards, competitiveness among businesses led to enhancing product quality and reducing prices, accompanied by higher levels of safety. In the end, standards enhanced levels of competence through promulgation of best practice (Skyrme).

One of the primary uses of benchmarking to identify best practices is to make best practices a vehicle for change to quality. Elmuti, et al. (1997) concluded that the target of the change can vary from the general, such as increasing productivity (process oriented), or to the specific, such as improving the design of an instrument (product oriented). By looking outside the company or organization at similar processes or products, new opportunities may arise for breakthrough solutions.

By identifying best practices, a company or organization may gain a better understanding of where it stands in relation to others. Learning from others who are more successful and sharing information will enable a company to understand its own operations better and be able to identify target areas for improvement. Additionally, using benchmarking to identify best practices can eliminate waste and help to improve a company's market share (Elmuti, et al., (1997).

Organizations that implement best practices frequently benefit from the team-building efforts of those involved in the implementation process, who are working toward a common goal—to improve performance. Blakeman (2002) reiterated that implementation of best practices is frequently smoother and more

successful when the ideas and concerns of affected team members have been considered.

Welsh and Metcalf (2003) wrote about the usefulness of best practices that resulted from the increased emphasis on accountability. They indicated that stakeholders in both the public and private sectors expect those in charge of increasingly constrained resources to be cognizant of the need for the efficiencies and effectiveness brought about by using best practices. They concluded that public and private sector organizations can use best practices as a starting point for developing effective and efficient business processes that conform to their own organization's structure and goals.

Best Practices: What Issues Surround Their Application?

One problematic issue hindering the use of best practices relates to the focus on data only (Elmuti, et al, 1997; Maire, Bronet, & Pillet, 2005). Adding to that problem, when statistical precision or metrics is assigned to the data, the processes used to arrive at the resulting data are frequently ignored. The value of best practices involves understanding the processes that produced the data and formulating ways to adopt those practices into the organization. Maire, et al. expanded on this idea by concluding that knowing that an organization is worse than the competition is of no value if the organization does not know why the competition is better.

There is a tendency for some organizations to look within the industry to identify best practices as opposed to learning from organizations that have similar processes but are not competitors (Fry, Humphreys, & Francis, 2005).

Fry, et al. emphasized that identifying best practices from outside an industry may overcome issues of competitive sensitivity that makes access to certain information unethical or even illegal. Codling (1997) warned that concentrating on learning from one industry fails to take into account the potential for significant breakthroughs suggested by best practices in other industries.

Identifying differences or variations to best practices requires the use of performance measures. The research literature suggests that both quantitative and qualitative data can contribute to these measures. While quantifiable performance measures can allow for the detection of variation to best practices, qualitative measures (nonmetric data) enhance the knowledge of quantifiable measures (metric data) by offering reasons for variations and possible solutions to ensure best practices (Buyukozkan & Maire, 1998; Higgins, 1997). However, Anderson and Gurney (1993) espoused the importance of quantifiable measures but acknowledged the difficulty of determining which variations in inputs resulted in which outputs.

Concern in recent research has focused on the appropriate transfer of best practices. According to Davies, et al. (2002), emphasis has shifted from identification of best practices to the need to manage and transfer best practices. Best practices literature is primarily descriptive of the practices that successful organizations have implemented. Much of the information is limited to identification and dissemination rather than an in-depth analysis of the specific practices, their uses, and implications for performance. A more detailed background to the practices could prove useful in helping an organization decide

whether a best practice is transferable or appropriate for its use. Davies et al. addressed this need by examining several studies that provided an analysis of best practices. However, they found that the "links with performance are general and there is little cause and effect analysis of the impact of the practices on performance" (p. 290).

The literature indicates that identifying best practices is a dynamic, evolving process not to be confused with a one-shot, quick-fix solution. It is a never-ending, learning process that should be integrated into an organization's culture and business practices. Once an organization has taken on the task of identifying and integrating best practices into its operations, the task does not end. Best practice advocates have claimed that results of performance and process improvements should continually be observed and opportunities for improvement should be sought out by all levels of the organization. For example, Weller (1996) reiterated that best practices, regardless of their potential for positive performance results, cannot promote the necessary changes to quality without the support and continuous involvement of the entire organization.

Accreditation of Institutions and Programs in Higher Education

Historical Perspective

While the search for quality has been a hallmark of business and industry, it has also been a part of higher education. The quality movement in American higher education began in the late nineteenth century with the establishment of private accrediting bodies that endorsed colleges and universities volunteering to participate in the accreditation process. These private accrediting bodies

evolved into several sectors including eight Regional agencies in six regions that now accredit entire institutions within their region; 48 Specialized or Programmatic agencies that accredit specific programs, such as healthcare management and social work; Faith-Based agencies that accredit religiously-affiliated or doctrinally-based institutions; and Private Career agencies that accredit institutions focused on a single purpose, such as business and information technology. These accreditors are recognized by the Council for Higher Education Accreditation (CHEA) and/or the United States Department of Education (USDE) (CHEA, 2006a; Morse, 2004). As of April 2006, the numbers of institutions and programs accredited by CHEA and/or USDE recognized accreditors included 6,814 institutions and 18,152 programs (CHEA, 2006b).

According to the CHEA (2006c), accreditation is defined as "a collegial process based on self- and peer-assessment for public accountability and improvement of academic quality" (p. 19). Both the USDE and the CHEA stated that the purposes of accreditation included:

1. Assuring academic quality to students and the public;
2. Allowing access to Federal funds such as student grants and loans and other federal support;
3. Easing transfer of courses and programs among colleges and universities; and
4. Engendering private sector confidence for employers who evaluate credentials of job applicants and who may be providing financial

support to current employees seeking additional education. (CHEA, 2006c, p.2)

There are other accrediting bodies that are not recognized; they either choose not to be recognized or do not meet the prescribed requirements for accreditation. For example, the Accrediting Council for Colleges and Schools, the American Federation of Colleges and Schools, the Central States Consortium of Colleges and Schools, and the Middle States Accrediting Board lack recognition from the USDE or the CHEA (CHEA, 2006d).

According to Wellman (2003), "Accreditation of higher education is a distinctively American invention, substituting for direct governmental regulation of academic standards…" (p. 58). While private accreditation has a long history as an accepted activity in the field of education in the U.S., most other countries rely on governmental supervision and control. U.S. institutions of higher learning initially implemented formal private accreditation as a means of differentiating themselves from less respected institutions such as art schools, normal schools, technical schools, music conservatories, and others (Leef & Burris, 2002; Times Higher Education Supplement, 2004).

Since its inception, higher education accreditation has been defined in a variety of ways, but consistently includes the following elements:

1. Accreditation is a voluntary process.
2. Accreditation is a process of external review against a set of pre-determined standards.

3. Accreditation is used by higher education for quality assurance and quality improvements. (Arnold, Kozel, & Velarde, 2004; Dodd, 2004; Leef, et al., 2002; Wellman, 2003)

Establishing minimum standards for admissions and course equivalencies (transfer of credits between institutions) further expanded the role of accreditation in higher education after World War II. In addition, with the passage of the *Servicemen's Readjustment Act* in 1944 (also known as the *G.I Bill*), state education agencies were required to determine the eligibility of institutions for federal research and financial funds. In 1952, Congress amended the *G.I.Bill* to authorize state education agencies to rely upon private accreditation to determine eligibility for financial aid (Leef, et al., 2002). At the same time, Congress passed the *Higher Education Act* (HEA) that created a link between eligibility for Federal student aid funds and accreditation. The HEA, under Title IV, required only institutions accredited by federally recognized accrediting bodies be allowed to accept and distribute student aid funds (Dodd, 2004).

Accreditation as a Guarantee of Quality

While institutional accreditation was often viewed as a guarantee that institutions and programs met certain standards, some researchers have questioned whether this guarantee assures quality. Based on their review of the literature in 2002, the American Council of Trustees and Alumni (ACTA) concluded that accreditation has not served to ensure the quality of programs or departments. The ACTA characterized the accreditation process as one that is not based on an evaluation of the results of an institution, but looks at inputs and

processes rather than at how institutions teach or what students learn. According to Lezberg (1999), accreditation cannot guarantee quality but can give reasonable assurance of the content and quality of the education being offered. Leef (2003) found that accreditation did not ensure academic quality because of the lack of academic rigor brought about by deterioration of the curriculum at many institutions. However, Eaton (2003) offered that accreditation does provide the public with access to considerable information in the form of a comprehensive listing of accredited institutions and the standards and processes used to determine accredited status. Further, Harvey (2004) asserted that accreditation is not separable from issues of quality because the underlying premise of accreditation intertwines with audit, assessment, and other forms of quality evaluation. Eaton (2003) and Kristoffersen, Sursock and Westerheijden (1998) surmised that accreditation may be more indicative of assuring a *threshold* [italics added] for quality; that is, accreditation sets norms and criteria which represent minimum standards for quality.

The U.S. system of accreditation represents a vast array of institutions and programs. Bollag (2004) discussed how the U.S. system of accreditation is widely praised for promoting quality in highly diverse educational settings. Volkwein, Lattuca, Caffrey and Reindl (2003) concluded that this diversity of educational institutions and programs may make a prescriptive set of quality standards non-responsive to the needs of students and industry. Although each accrediting agency establishes its own standards by which institutions and programs are accredited, all address similar areas, such as student achievement,

faculty, services and academic support for students, curriculum, and financial capacity. Any efforts to standardize accreditation in order to ensure quality may be too complex an endeavor considering the numbers of institutions involved and their differing missions (Volkwein, et al., 2003; Wergin, 2005).

In 2001, the Council of Regional Accrediting Commissions (CRAC) studied each of the regional accrediting commissions and their approach to assessing student learning. One product of that study was the adoption of the "Principles for Good Practices" in 2003 which dealt with accreditation assuming responsibility for evaluating the quality of student learning. This study concluded that:

1. The quality of student learning was defined differently by different institutions and depended on the specific learning mission.
2. Accreditation should not dictate a common set of learning outcomes but rather learning goals must relate to institutional mission and to the certificate or degree awarded.
3. Collective evidence of learning outcomes should be in multiple forms and interpreted from multiple perspectives.
4. Accreditation functions not only to assure academic quality but to help institutions make educational improvements.
5. Accreditation should focus on examining how well institutions align mission with learning goals, learning goals with learning activities, learning activities with learning evidence, and learning evidence with improvement of educational practice. (p. 32)

In contrast to the conclusions of the ACTA (2002), the CRAC (2001) praised and encouraged the role of accreditation and its responsibility for evaluating the quality of student learning. Along with responsibility for student learning, the CRAC advocated a role for accreditation that respects the diverse missions and goals of higher education institutions. Further, Contreras (2005) stated that adopting a culture of sameness may mean that standards are "pushed down," and not maintained at a high level (p.1). Even the U.S. Department of Education (USDE) referred to the goal of accreditation as ensuring that education provided by institutions of higher education meet "acceptable levels of quality" (USDE, Overview of Accreditation, n.d., ¶ 1). However, Dodd (2004) concluded that accreditation standards can be used as a guide for assessment, planning, and resource allocation and that higher education can look at accreditation standards as representing best practices.

Along with accreditation standards, a number of higher education institutions have used the Malcolm Baldrige National Quality Award criteria as a framework for self-assessment, planning, and improvement initiatives. Some regional accrediting agencies allow the use of the Baldrige criteria as an alternative format for accreditation. In 1999, the North Central accrediting agency initiated an alternative accreditation format entitled the Academic Quality Improvement Project (AQIP) which is modeled on the Baldrige award. The AQIP criteria differ from traditional accreditation criteria in that they focus on process, results, and continuous improvement (Dodd, 2004).

In summary, accreditation of institutions and programs in higher education functions as an individualized process taken on by institutions to establish educational credibility. It was never intended to be a method for rating one institution against another.

Accreditation and Accountability

Accreditation in higher education has typically been tied to educational accountability through accreditors' established recognition standards. Accreditors were first mandated to look at student learning outcomes as a condition of recognition, in the USDE rules established in 1989. In 1992, in the reauthorization of the *Higher Education Act*, the USDE added the criteria that accreditors were required to look at student achievement as a measure of academic quality (Farrell, 2003). However, lacking specific directives, accreditors focused on external peer review, self-reviews, and certification as proof of academic quality. Daigle and Cuocco (2002) found that those efforts seldom resulted in sustained or long-term improvements leading to increased accountability. In light of decreasing resources beginning in the 1980s, public officials and the general public demanded greater accountability in higher education, particularly in terms of return on investment and added value. With this growing demand for accountability, in 1989 accreditors adopted formal policy language used in their recognition standards that specifically stated the following: "Demonstrate accountability: Accreditors have standards that call for institutions and programs to provide consistent, reliable information about academic quality and student achievement to foster continuing public confidence and investment"

(CHEA, 2006b, p. 3). This policy is still reflected in the current recognition standards of both the CHEA and the USDE as revised in January, 2006. What remains unclear and controversial is how to demonstrate student learning as an outcome of higher education—what constitutes acceptable evidence of student learning. Accountability systems vary from program reviews, accreditation reviews, data submission, financial audits, and regular trustee or governing board oversight. To further address what constitutes acceptable evidence of student learning, in November, 2005, the CHEA established the Award for Institutional Progress in Student Learning Outcomes. The purpose of the award was to acknowledge outstanding institutional progress in developing and applying evidence of student learning outcomes either institution-wide, within a specific program, or in a specific major. What is significant about the award criteria is that institutions had to provide evidence that articulated and demonstrated successful student learning outcomes, evidence that the public was informed, and evidence that outcomes were used for institutional improvement (CHEA Chronicle, 2006). In addition, evidence had to be relevant to the claims and verifiable through replication or third-party inspection. Examples of direct evidence included: comprehensive or capstone examinations, performance on licensure or external examinations, and authentic performances or demonstrations. Ewell (2002) agreed that direct evidence of student learning outcomes should be "relevant, verifiable, representative, cumulative, and actionable" (p. 2). According to Wellman (2002) nearly all states claimed to have some kind of accountability system for higher education that required evidence of

student learning outcomes, but the systems overall proved inadequate in addressing the public's need for more information on how institutions perform in relation to each other. However, accreditation of institutions and programs in higher education functions as an individualized process taken on by institutions to establish educational credibility and was never intended to be a method for rating one institution against another. Instead of a competitive function, Wellman (2002) called for accountability systems that help the public understand how higher education uses scarce resources to increase productivity and create added-value. Similarly, the CHEA (2006) considered their efforts to require evidence of accountability a clear indication that higher education was being proactive in addressing the challenges of how to demonstrate student learning outcomes.

Rating and Ranking of Institutions of Higher Education

A more competitive approach to quality in higher education is found in systems of institutional and program rating and ranking. As early as 1886, the United States Bureau of Education grouped women's colleges into two classifications of academic quality, Division A and Division B. Those institutions placed in Division A were considered the traditional liberal arts colleges; all others were classified as Division B (Webster, 1984). This practice continued until 1911 when the United States Bureau of Education undertook a more complex classification process that stratified men's and coeducational colleges and universities as well as women's colleges. The Report of the Commissioner of Higher Education for the Year Ended June 30, 1911, was the first effort that

proposed to rank institutions of higher learning based on academic quality. Of the 602 American colleges and universities in existence at that time, 344 were divided into five levels of quality. The sole criterion for comparison consisted of one variable: the performance of each institution's graduates after they entered graduate school (Webster, 1984; 1992). In some cases, the ranking given a school was limited to only some of its programs or to its more recent programs. Under protest from many deans and college presidents, little support existed for approving this ranking system. The major criticism was that the overall ranking of an institution was based only on the one criterion. Webster (1984) theorized that this attempt at ranking was viewed by the academic community as a form of government interference and reported that subsequently, both Presidents Taft and Wilson refused to sign the order approving release of the report and it was never officially published. The Bureau of Education made no further attempts to rank American colleges and universities according to its one criterion of quality. However, Hattendorf (1996) stated, "There is no question that these early rankings influenced greatly the thinking of educators concerning quality assessment" (p. 2).

Ranking of American colleges and universities remained an ongoing phenomenon primarily concerned with what specific criteria should be used to determine quality rankings. Webster (1986) asserted that academic quality ranking should include two components:

1. It [quality ranking] must be arranged according to some criterion or set of criteria, which the compiler(s) of the list believed measured or reflected academic quality.
2. It [quality ranking] must be a list of the best colleges, universities, or departments in a field of study, in numerical order according to their supposed quality, with each institution or department having its own individual rank, not just lumped together with other schools into a handful of quality classes, groups, or levels. (p. 5)

A recent study (Wissenschaftsrat, 2004) completed for the Federal Government of Germany agreed with Webster (1986) that ordinal rankings can only make sense if a certain set of specific conditions or criteria are fulfilled.

Even critics of academic quality rankings have agreed that ranking criteria are necessary. However, differences in the methodologies used to determine the criteria have resulted in much debate. A primary concern has been whether education rankings should be statistics-based (inherently factual), opinion-based (subjectively judgmental), or a combination of both (Carter, 1998; Dean, 2000; Graham & Diamond, 1999; Hattendorf, 1996; Kirk & Corcoran, 1995; Lederman, 2006; Thompson, 2000; Webster & Skinner, 1996).

At the center of this debate is the use of opinion-based reputational rankings or peer assessments as a criterion for determining education quality (Arenson, 1997; Clark, 2002; Crissey, 1997; Ehrenberg, 2001; Graham, et al., 1999; Hattendorf, 1996; Hodges, 2002; Holub, 2002; Kirk, et al. 1995; Ray, 1997; Thompson, 2000; Time Magazine, 2006; University of Illinois, 2005; West &

Rhee, 1995). Astin (1988) referred to the reputational view of quality as a type of folklore in which "excellence is whatever people think it is" (p. 25). The primary criticism of reputational rankings has been the lack of a clear definition or direct measurement of quality. Notwithstanding these criticisms, Tan (1986) and Conrad and Blackburn (1985) argued for the merit of reputational rankings, provided that the methodology is continuously improved, that quality is based on multiple criteria, and that standards for quality are specified.

Among the most frequently criticized, yet widely read, college ranking publications is *U.S. News & World Report's* (USNWR) yearly rankings of America's Best Colleges and rankings of graduate programs in many specific majors. USNWR, in its 2007 rankings, applied 25 percent of an undergraduate school's weighted ranking to a formula that used a subjective measure of academic quality determined by a peer assessment survey, while 75 percent was based on objectives measures. USNWR (2006) defended their formula by claiming that graduation from a distinguished or more selective college helps graduates get better jobs and provides an advantage to students seeking admission to first-rate graduate programs. However, Dale and Krueger (2002) found that students who were accepted at highly selective colleges but chose to attend less selective schools were earning about the same 20 years later as their peers from the more selective colleges. Gibbs, et al. (2006) noted that the value of graduating from a prestigious school has diminished in the global environment where the economy has become increasingly performance-based. Despite the criticism that reputational ranking is a subjective criterion based on opinion,

numerous publications (including *The Gourman Report*, *Money* magazine, *Barron's*, and *Time/Princeton Review*) continue to see value in its inclusion as a valid quality indicator in their education rankings. Even when more than one variable has been used in the ranking process, the variables used by different ranking publications varied among the reports (West, et al., 1995).

The research literature suggests that objective measures for ranking academic quality have a higher rate of acceptance and credibility among most educators. To enhance its standing among education experts, USNWR designed its survey to attribute 75 percent of its weighted ranking score to variables such as retention (20 percent), faculty resources (20 percent), student selectivity (15 percent), financial resources (10 percent), graduation rate performance (5 percent), and alumni giving rate (5 percent). The magazine justified this ranking methodology by claiming that its judgment was based on years of experience about "how much a measure matters" (U.S. News & World Report, 2006, p. 78). Although several of USNWR's indicators have been used traditionally to measure quality, the fact that USNWR assigns weights to the categories and indicators within categories to produce a composite score, differentiates its ranking methodology from most others. Educators and others have been critical of this methodology because they felt that the USNWR rankings have the appearance of scientific objectivity without any defensible empirical or theoretical basis (Ehrenberg, 2001; National Opinion Research Council, 1997).

Webster (1992) concluded that magazine rankings were successful because few other sources provide useful information about institutions' comparative quality. Accrediting agencies, college catalogs, and most published guidebooks provide detailed descriptive information such as information about campus organizations, housing availability, local sights, and transportation, but offer far less perspective on the overall college experience and other factors affecting academic success.

In summary, although the rating and ranking of institutions of higher learning continues to be highly debated, it shows no indication of diminishing in its role of providing information to those seeking some basis for differentiating one college or university from another.

History of Professional Pilot Programs in Higher Education

Professional pilot training programs in higher education have their roots in wartime training of military pilots. Prior to World War II, most flight training schools were commercially operated, and a few colleges and universities had programs that combined the study of aeronautics with engineering (Mangrum, 2003). Beginning in 1927 and preceding wartime training efforts, the Daniel Guggenheim Fund for the Promotion of Aeronautics provided grants for aviation education through New York University. This endeavor was aimed primarily at persuading young Americans to take up flying and further to build up the young aviation industry. Other efforts to promote air age education were initiated by the Air Cadets of America, establish in 1933 by the American Legion; the Junior Birdmen of America, founded in 1934 and sponsored by the Hearst newspaper

chain; and the Air Youth of America, founded in 1940 by Laurence S. and Winthrop Rockefeller (Pisano, 1993). However, according to Kiteley (n.d.), the majority of today's collegiate aviation programs originated with the Civilian Pilot Training Program (CPTP) authorized under the *Civil Aeronautics Act of 1938*. In an effort to boost general aviation, 13 colleges and universities received government funding under this Act beginning in 1939 to provide flight training to 20,000 college students a year. Among those original institutions were Purdue University, University of Michigan; Georgia Institute of Technology, Pomona Junior College, San Jose State Teachers college, and the Tuskegee Institute. By October, 1939, the Civil Aeronautics Authority had authorized over 300 colleges and universities in 47 states to participate in civilian pilot training under the CPTP (Pisano, 1993).

However, the threat of the onset of World War II provided the CPTP added opportunities to train pilots when the U. S. Army Air Corps and the Navy decided to accept CPTP graduates directly into military pilot training. After the attack on Pearl Harbor and the U.S. entrance into World War II, the CPTP became the War Training Service (WTS) and from 1942 to 1944 functioned primarily as the screening program for potential military pilots. During this same period, President Roosevelt called for the building of 60,000 aircraft in 1942 and another 100,000 aircraft in 1943 (Craft, n.d.).

At this point, the involvement of educational institutions in pilot flight training was deemed a necessity and grew to approximately 1,132 colleges and universities that contracted with the Federal government to incorporate the CPTP

curriculum (Guillemette, n.d.). Students received 240 hours of ground training at a college or university and up to 35 hours of flight instruction, either at the college or university or through a flying school sub-contracted by the college. Upon completion of the required courses and 200 or more accumulated flying hours, a student obtained a commercial pilot license and agreed to sign a contract to enter the military following graduation (Craft, n.d.; Guillemette, n.d.; Millbrooke, 1999). Although the CPTP/WTS was phased out beginning in 1944, over 435,000 people had been trained as airplane pilots. Following World War II, flight training programs continued to expand, partly because Reserve Officer Training Corps (ROTC) programs at colleges and universities included flight orientation as part of their required training (Kiteley, n.d.). Mangrum (2003) stated, "The CPTP did more in terms of cementing aviation as a university-level academic pursuit than anything before or since its time" (p. 43).

While few major airlines require a college degree for employment, more than 95 percent of the pilots hired over the past several years have at least a bachelor's degree (Spangler, n.d., ¶ 4). Applicants with a degree have a definite advantage over those who do not. This focuses issues of quality and standards on pilot training programs in higher education institutions.

A review of degree programs in catalogues indicates that present day baccalaureate aviation programs frequently consist of 120-130 semester hours and include options such as professional pilot, aviation management, and technical services (maintenance or avionics). Within these baccalaureate aviation programs, professional pilot training curricula at most colleges and

universities specifically focuses on flight operations leading to the commercial pilot certificate and instrument rating, with options for multi-engine and/or flight instructor certificates. For example, the professional pilot training option at Oklahoma State University consists of 120 semester hours of study leading to a Bachelor of Science degree in Aviation Sciences (Professional Pilot Degree Sheet, 2005-2006). The professional pilot option includes certification as a Commercial Pilot with Instrument Rating (single and multi-engine) and Certified Flight Instructor. At Kent State University, undergraduates can obtain a Bachelor of Science degree in Aeronautics with an option in Flight Technology (professional pilot training) upon completing 128 semester hours of coursework (Flight to Success, n.d.). Purdue University offers a Bachelor of Science degree in Professional Flight Technology (professional pilot training) consisting of 128 semester hours (Professional Flight Technology Plan of Study, n.d.). To complete an undergraduate professional pilot training program at Kansas State University, a student must take 124 semester hours of coursework (K-State Undergraduate Catalog, 2006). In reviewing course requirements, the researcher found that little difference exists among various college and university professional pilot training curricula. The one program area that occasionally varied was the requirement for the certified flight instructor rating and/or the multi-engine rating, which were optional for a bachelor's degree at some schools and mandatory at others. However, in general, professional pilot training programs at four-year institutions were found to be consistently uniform due to the nature of compliance required under Federal Aviation Regulation Part 141,

which determines the requirements for operation and certification as an approved flight school.

The history of flight training in higher education is long and enduring and shows no signs of diminishing. With the ongoing decline in the U.S. military as a source of trained pilots, industry's reliance on collegiate aviation programs is expected to be stronger than ever (Kiteley, n.d.).

Past Attempts to Rate Aviation Programs Using Quality Indicators

After World War II, collegiate aviation students were often confused by the variety of aviation training programs being offered in colleges and universities. The advent of the jet age in the 1960s required new training programs to accommodate the development of advanced aircraft types. Information concerning the quality of various programs was not available to guide the aspiring professional pilot in choosing or evaluating a specific program's merit or worth (Kiteley, n.d.). The first attempt that enabled prospective students to compare various collegiate flight programs was in 1976 with the publication of *College Aviation Accreditation Guidelines.* These guidelines established standards for curricula, courses, and credits; they were primarily designed to provide guidance to colleges and universities concerning curricula accreditation, that is, evaluating and authenticating aviation academic programs for formal accreditation (Collegiate Aviation Accreditation Guidelines, 1976; Council on Aviation Accreditation, Inc., 2005). Prospective aviation students could look at the guidelines and get a sense of whether a particular institution met uniform standards with regards to curricula, faculty qualifications, administrative support,

type of facilities and equipment available, financial resources, and other factors. However, no indicators of quality existed for determining how the institution met or exceeded the standards outlined in the accreditation guidelines. At best, these guidelines provided minimal assistance to students in determining the quality of one program over another program (Collegiate Aviation Accreditation Guidelines, 1976). However, accreditation guidelines were the first effort to provide some clarification about the differences among aviation programs in higher education.

Through document review and analysis, the researcher verified that most publications available to today's prospective professional pilot student offer primarily a description of the various higher education aviation programs. The *Collegiate Aviation Guide* published by the University Aviation Association (UAA) lists post-secondary institutions offering nonengineering aviation programs. This guide provides information about tuition, credit hour requirements, cost of specialized programs such as flight, and the different degree options offered by each institution. The University Aviation Association refers to the guide as an "initial screening device" to help identify those institutions in certain geographic locations that might be appropriate for a student's educational goals and individual needs (UAA News Release, ¶ 2). Although this information may assist in the decision-making process, it does not address factors related to quality such as teacher qualifications, curriculum and instructional quality, and student achievement.

The Aircraft Owners and Pilots Association (AOPA) is a non-profit organization representing more than 408,000 pilots in the United States and is considered the most influential aviation association in the world (AOPA Flight Training, n.d., ¶ 2). The AOPA publishes *Flight Training* magazine, which is a monthly periodical providing information on a variety of topics including aviation education and training. This magazine maintains an on-line aviation college database designed to be searched by city, state, and/or type of training offered. Once again, the researcher discovered that the information provided is descriptive in nature, listing a contact name, phone number, email address, type of degree(s) offered, type of training, and a link to the institution's web site. No qualifying criteria are required for determining inclusion in the database. Like the *Collegiate Aviation Guide*, the AOPA college database does not provide information related to quality indicators such as teacher qualifications, curriculum and instructional quality, and student achievement.

In summary, available literature and institutional documents revealed that vast amounts of information about flight training programs exist in numerous media formats. However, no past attempts to rate or rank collegiate flight training programs using quality indicators are evident in the literature.

Reasons for Interest in Identifying Exceptional Pilot Training Programs

Collegiate professional pilot training programs have historically relied primarily on government compliance with Federal Aviation Administration (FAA) regulations to assure the public that standards are met pertaining to personnel, aircraft, facilities and equipment, curriculum, maintenance records, training

records, and other factors. This strict adherence to FAA standards is a guarantee of legal compliance and minimum academic quality. The requirements for certification as an FAA approved flight school are defined in the Code of Federal Regulations, Federal Aviation Regulation (FAR) Part 141. Although certification by the FAA is not a requirement for the operation of a collegiate flight training program, most colleges and universities with professional flight programs choose to be certified in order to participate in government programs such as Veteran's Administration student benefits. In addition, foreign students are a major source of revenue for many collegiate flight training programs. Since September 11, 2001, government regulations concerning the flight training of foreign nationals have become more stringent. According to current Federal regulation, foreign students who seek professional pilot training in the United States must meet certain requirements in order to obtain the required Exchange Visitor (J) visa. A specific criterion for a J visa is that foreign students receive professional pilot training from an flight school approved under FAR Part 141, and that the school is accredited by an accrediting agency which is listed in the current edition of the United States Department of Education's *Nationally Recognized Accrediting Agencies and Associations* (Department of State Regulation Sec. 62.22(n)(1)(i), n.d.). These requirements add some measure of control over flight training and assurance to the American public that flight safety begins with quality flight education and training.

However, after the occurrence of September 11, 2001, and the averted British terrorist plot of August, 2006, the American flying public voiced an

increased concern for all aspects of flight safety. This public concern for air safety has caused a greater awareness of the need for closer scrutiny of all facets of the aviation industry, including access to aviation training programs. Accountability and its usefulness as a way to instill public confidence have become a primary focus (GAO, 2003; Johnstone, 2006; Sweet, 2003; Thomas, 2003; Trento & Trento, 2006). Accountability should be indicative of quality and result in continuous program improvement in pilot training, not just listings of institutions describing various aviation programs. As with identification of best practices in business and industry, the identification of quality indicators in professional pilot training programs also needs to go beyond the identification and dissemination of descriptive information. Currently, accreditation is the only organized means by which higher education provides quality assurance to the larger public (Wergin, 2005). Qualification for accreditation is viewed by some as a step in the right direction as schools must show good academic content in their flight training programs, good administrative procedures, and policies designed to protect the rights of students (Phillips, 2006; USDE, n.d.). The impetus for this study came from the lack of quality indicators for collegiate professional pilot training programs in current literature and the personal experience of the researcher. Identifying quality indicators could support best practices, accountability, accreditation, and help in the development of standards for exceptional collegiate professional pilot training programs.

Summary and Conceptual Link to This Study

Current literature clearly indicates that much descriptive information exists about collegiate professional pilot training programs. While the information that is available provides useful descriptions of various programs, the vast majority of the information provides little data relating to program quality and does not necessarily address the specific characteristics that actually define a top-rated program within the aviation field. Clear quality indicators and benchmarks such as those found in industry are conspicuously missing. Specifically, information pertaining to flight programs in higher education is lacking in the areas of teacher and faculty qualifications, curriculum and instructional quality, and student achievement. This information, along with knowledge about a collegiate flight program's facilities, equipment and technology, government compliance, support services, completion rates, assessment/evaluation practices, and other factors, could provide a sounder basis for establishing a set of quality indicators. These quality indicators could prove useful for future development of a rating and/or ranking system for professional pilot training programs in colleges and universities, similar to those used in other areas of higher education. Further, identifying quality indicators for professional pilot training programs could assist in the development of best practices and standards for those programs. With a common understanding of what constitutes an exceptional professional pilot training program, students might have a basis for comparison among institutions. In addition, aviation educators would be better equipped with the knowledge

needed for convincing prospective students that their programs are exceptional and meet the needs of the aviation industry.

CHAPTER III

METHODOLOGY

Research Model

General Research Approach

This study used a descriptive research model to collect the opinions of aviation education experts regarding the quality indicators they perceived to comprise an exceptional professional pilot program at four-year institutions of higher learning. Descriptive research uses qualitative and/or quantitative methods to describe or interpret a condition, situation, or event. According to Gay (1987), descriptive research involves collecting data in order to answer questions concerning the current status of the subject of the study—it reports the way things are (p. 189). This study employed a mix of both qualitative and quantitative techniques to collect and analyze its descriptive data.

Specific Research Model: Delphi Method

The specific descriptive research technique used in this study was the Delphi method, which was originally developed and refined by the Rand Corporation in the 1950s and 1960s for the U.S. government as a technique to help the military reach consensus pertaining to long-term strategies of national defense. Since that time, the Delphi method has gained wide acceptance as a

preferred means of eliciting and refining the opinions of a homogeneous panel of experts. Ausburn (2003) stated that, "The technique uses a panel of experts and a facilitator to obtain, distill, and converge multiple inputs on a designated question or issue" (p.84).

One of the major strengths of the Delphi is that the guarantee of anonymity of input provides an open forum where participants are more willing to share information and perspectives more honestly. This is accomplished through a series of input rounds and controlled feedback. Input from each round is collected, analyzed, and synthesized by the facilitator and subsequently provided as anonymous feedback to the panelists. Over the course of the rounds, the opinions of the panelists begin to come together to reflect a consensus of views. Generally after three to four rounds, a clear depiction of the group's views is evident (Lindstone & Turoff, 1975; Martino, 1972). Based on these generally accepted criteria, this study employed three Delphi rounds.

The Delphi technique used in this study was a mixed method approach that used both qualitative and quantitative methods to collect data from a panel of aviation educators who had been identified as experts by their peers via an initial solicitation. The use of Delphi to address education issues has precedent in published research. According to Lindstone and Turoff (1975), the Delphi technique has been used to facilitate input for curriculum development. McGoldrick, Jablonski and Wolf (1995) used the Delphi as a way to assess a patient education program in a nursing department, and Sullivan and Brye (1983) used the Delphi technique in curriculum planning in a nursing education program.

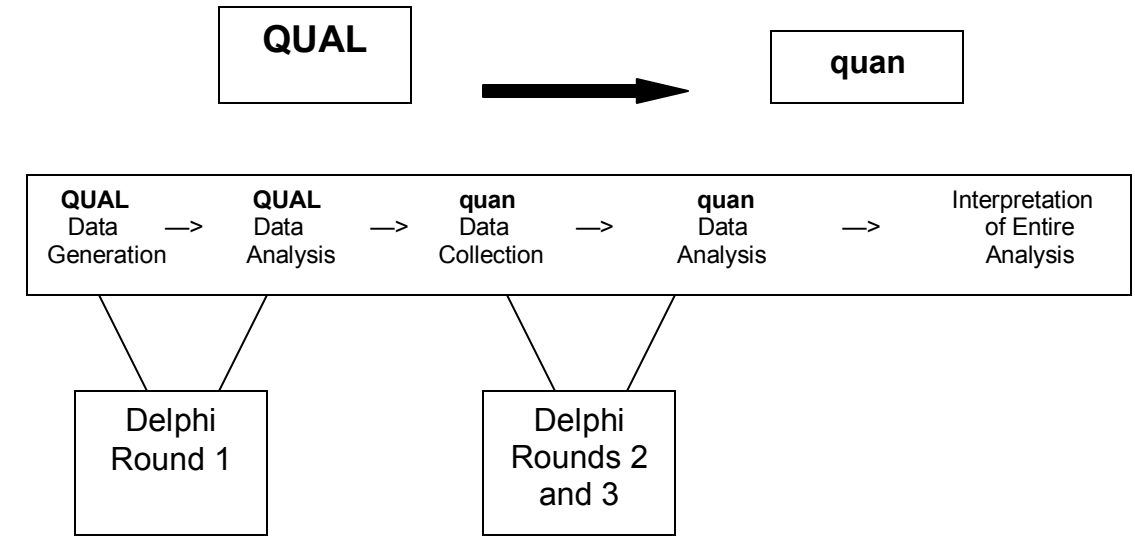
Ausburn (2002, 2003) used the Delphi to address teachers' perceptions on emerging educational issues.

Mixed-Method Delphi Design

In this study, a mixed-method Delphi design was used that combined qualitative and quantitative techniques for data collection and analysis. Creswell, Plano Clark, Gutmann, and Hanson (2003) defined mixed-methods research as:

> …the collection or analysis of both quantitative and/or qualitative data in a single study in which the data are collected concurrently or sequentially, are given a priority, and involve the integration of the data at one or more stages in the process of research. (p. 212)

The mixed method model that best describes the qualitative/quantitative blend used in this study is the sequential exploratory approach. The following model was applied, using Creswell's (2003) adapted notations and clarifications added by the researcher (see Figure 2).



QUAL Capitalization indicates a priority on qualitative data and Analysis

quan Lower case indicates a lesser priority

An arrow indicates sequential data collection

Figure 2. Sequential Exploratory Research Model. Note: From *Research Design* (p. 213), by John W. Creswell, 2003, Thousand Oaks, CA: Sage Publications, Inc. Copyright 2003 by Sage Publications, Inc. Adapted with permission.

The problem or question raised in this study provided the best match with the integration of both qualitative and quantitative approaches to data collection and analysis to profit from the advantages of both approaches (Creswell, et al., 2004). Using this approach allowed the researcher to give priority to the data-generating qualitative phase, and then move to the secondary quantitative data collection and analysis stage to establish structure and order in the generated data.

The mixed-method design used in this study began with the critical qualitative Delphi opening round wherein a selected panel of aviation experts was asked to provide responses to an open-ended question about their individual perceptions of the quality indicators of exceptional professional pilot programs in higher education. This phase was accomplished in round one. After this opening round, which generated the data input for the study, the emphasis switched to quantitative collection and analysis of the data to develop a convergence or consensus of the expert panel's perceptions.

Data analysis occurred in all three phases of the research from input provided by the panelists in all three rounds. In rounds two and three, the panelists were provided feedback in the form of statements or comments and they were asked to numerically rate and rank these statements. However, since this study was essentially qualitative in nature, the observation by Creswell (2003) that "this model could make a largely qualitative study more palatable to a quantitative adviser, committee, or research community that may be unfamiliar with the naturalistic tradition" (p. 216), made this mixed methods model a strong approach to use with the study. The quantitative component also facilitated clarity and simplicity of communication of the findings of the study.

In conclusion, the mixed-method sequential exploratory research model was compatible with the study's purpose, which was to provide what Viadero (2005) described as "the potential for deeper understandings of some education research questions that policymakers [educators] need answered" (p. 2).

Delphi as used in this study had some aspects of phenomenological inquiry as a strategy for answering the research question, in that it allowed for the human experience of each panel expert to provide what Willis (1991) claimed "results in descriptions of such perceptions which appeal directly to the perceptions of other people" (p. 174). Also, Turoff and Hiltz (1995) stated that "The Delphi procedure consists of a series of steps undertaken to elicit and refine the perspective of a group of people who are either experts in the area of focus or representative of the target group" (p. 75). The Delphi approach can provide data that might influence those who are in a position to determine the makeup or characteristics of educational programs and curricula such as aviation. Phenomenological inquiry is a good fit with the Delphi format wherein the expertise of the panel provides the base of perspectives from which the "best possible examples" may be derived (Willis, p. 176).

Methodology

Population and Sample: The Delphi Panel

McMillan and Schumacher (1993) defined a population as "a group of individuals or events from which a sample is drawn" (p. 596). The population for this study was the faculty of the 58 four-year post secondary aviation programs in the United States. Sampling from this population was done using the "panel of experts" approach that is typically used for Delphi studies.

The Delphi technique typically utilizes a non-random purposive sample of experts (participants) to provide data for analysis. Ausburn (2002) stated that "the focus in selecting participants is not so much their representativeness of a

population, but their *knowledge or expertise* in the topic under examination" (p. 37). Other researchers have also emphasized the positive aspect of using a select group of experts with little diversity (Turoff & Hiltz, 1995). The participants in this study were selected from a list of nominees compiled from an initial solicitation of aviation educators at four-year institutions with active professional pilot programs. The participants, or Delphi panel, were solicited and selected according to procedures described below. This process resulted in a Delphi panel of 13 aviation experts representing 11 states (see Figure 3).

Procedures

In this study's Delphi, an initial solicitation was conducted of the 58 four-year institutions within the United States that offer professional pilot programs. This listing of four-year institutions was originally compiled in a study conducted by Bliss, Green and Larsen (2004), in which four-year institutions with professional pilot training programs were asked to respond to a survey regarding significant issues in aviation about the repercussions of September 11, 2001. This list was used in the present study as a source for soliciting nominees for participation in the study. All 58 institutions were asked to nominate a minimum of two individuals (aviation experts) from other institutions to serve as panel members for the Delphi study. This initial solicitation to identify nominees to participate in the study was conducted by mail and included a cover letter and nomination form (Appendix A). The respondents to the solicitation were asked to nominate a minimum of two persons from other institutions with appropriate expertise to serve on the panel. Solicitation respondents were provided the

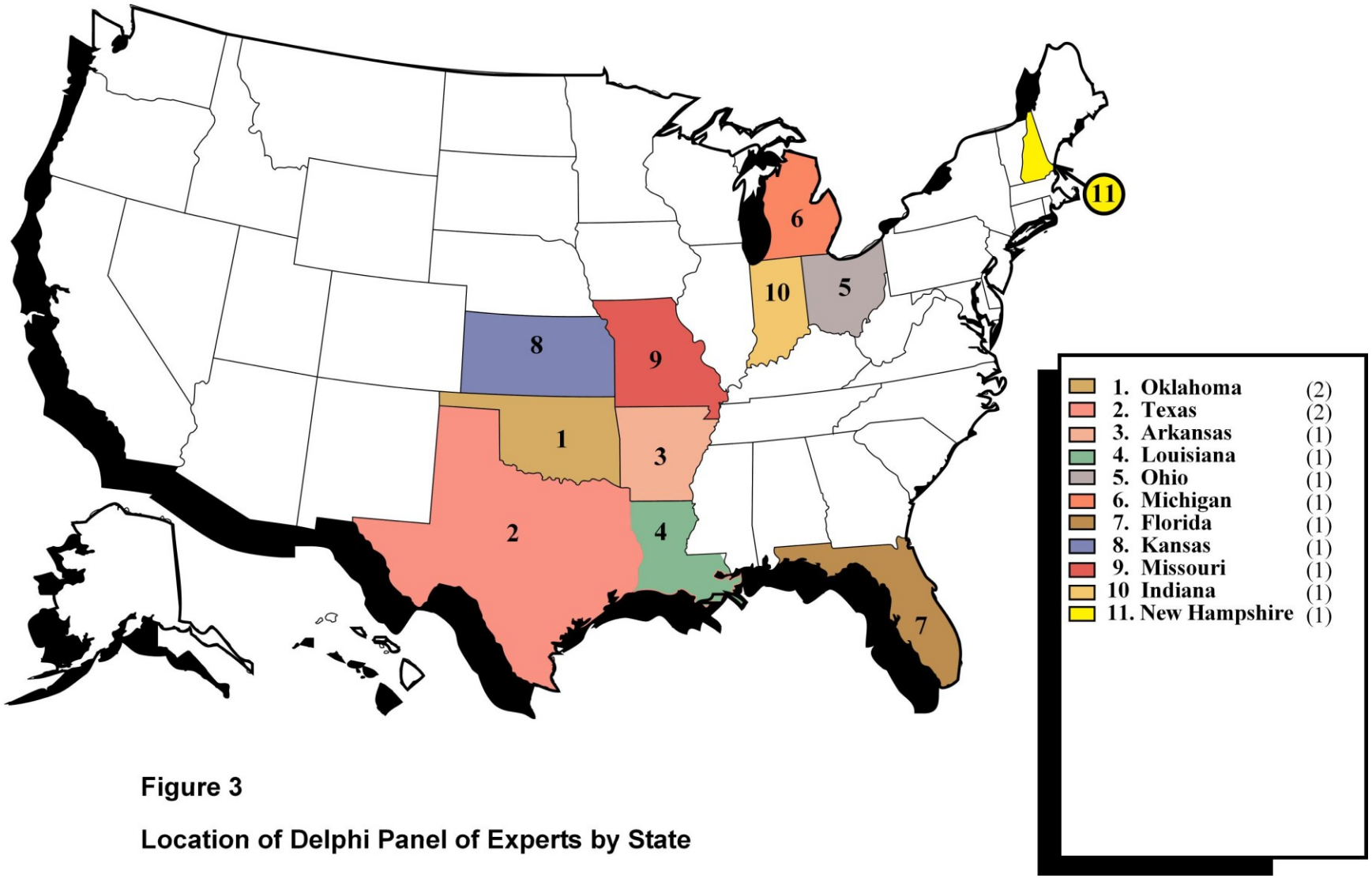


Figure 3

Location of Delphi Panel of Experts by State

following criteria for identification of nominees to participate in the research study:

1. Nominees must be an aviation faculty member of a four-year institution with a minimum of five years of university experience in a professional pilot training program.

Rationale: Faculty who have been involved in a professional pilot training program for this period of time were assumed to have the requisite experience to make sound recommendations regarding the characteristics of a quality program.

2. Nominees must have experience using electronic mail in order to send and receive messages; experience printing from electronic mail; and have the ability to download and upload computer data files.

Rationale: The Delphi technique was implemented via electronic mail to capture three successive rounds of input from the panel of experts as well as provide analysis and feedback from the researcher to the panel.

An initial listing of all nominees was generated (Appendix B). This listing was refined by the researcher to eliminate duplications and from this listing, a purposive sample of potential panelists was identified for subsequent solicitation for participation in the study. A total of 38 nominations were received and of these, only one nominee received two nominations, resulting in 37 unique nominations. A letter explaining this study and a consent form were sent by electronic mail to all 37 nominated participants (Appendix C and Appendix D). Of these, 16 nominees signed the consent form agreeing to participate as a Delphi panel expert.

It was originally planned to purposively select nominees in proportion to their geographical areas of representation within the continental United States. However, it was necessary to confine participation to those nominees who volunteered to participate. The total number of nominees who agreed to participate and actually completed all three Delphi input rounds was 13, representing 11 states within the continental United States (Figure 3). Because expertise in a Delphi panel is more important than representativeness (Ausburn, 2002; Turoff & Hiltz, 1995), this composition was considered appropriate for the study.

This panel of 13 experts provided individual perceptions based on the personal experiences of each expert to help the researcher arrive at a consensus about the quality indicators of an exceptional collegiate professional pilot program.

All interactions between the panelists and the researcher were carried out via email. Data input forms and researcher feedback were exchanged through individual email addresses. At no time did panelists interact personally with each other, and anonymity of all input was protected and maintained by the researcher.

Instrumentation and Data Collection

The research study was conducted using the Delphi technique to gather data through a series of input rounds. For this study, three questionnaires were developed for use with the participants. For round one input, an open-ended questionnaire was emailed to participants immediately upon receipt of their

signed consent form. On this form, participants were asked to provide their perceptions regarding the quality indicators for collegiate professional pilot training programs at four-year institutions. Categories were provided to guide the thinking process, but responses were not limited to the specified categories. Participants were invited to provide additional comments if desired. After each round, a new input form and feedback from the previous round was provided to the panelists. All feedback was compiled by the researcher from the data collected in the previous round. In round one, panelists were asked for open-ended input to identify what they perceive to be quality indicators for collegiate professional pilot training programs in nine specified categories and one category for miscellaneous comments (Appendix E). The researcher analyzed the responses qualitatively through constant comparison method to identify emerging themes. In round two, the researcher submitted a list of nominated indicators to the panelists based on synthesis of round one input, and the panelists were asked to rate and rank order the categories and the items within each category (Appendix F). During round three, the panelists again received a feedback and input form and were asked to complete a final rating and ranking based on feedback from round two (Appendix G). The researcher established a specific deadline for each round of input. Follow-up was conducted via electronic mail and telephone to increase the rate of participation.

Data Analysis Techniques

After round one, data were analyzed qualitatively using the constant comparison method. The qualitative analysis of the data was performed by

synthesizing data to identify emerging themes through content analysis and category coding techniques (Gay, 2000; Guba & Lincoln, 1985; Merriam, 1998). Upon receipt of the first round input from the panelists, the researcher analyzed the content of the responses within each category for emerging themes, and a summary statement or item was written for each theme identified. The researcher conducted a peer-check using two professionals to cross-check categorization and coding of statements; one professional was from aviation higher education and one was from the medical field. Before round two input, a combination round one feedback/round two input form was provided to the panelists with an unranked set of statements and frequencies derived from the thematic content analysis of round one input and spaces provided for structured round two input.

Thus, in the second round, the panelists were provided a summary of round one and input form for round two. They were asked to analyze and evaluate the items from round one and to rate them by category and by items within category, with a rating of 1 being not important; 2 being somewhat important; 3 being moderately important; 4 being important; and a rating of 5 being very important. Panelists then rank ordered the categories and items within each category in descending order, with the first choice listed as rank one and the *nth* choice as rank *n*. After round two, a rank-point system was used to calculate a "sigma rank point" (ΣRankPoint) score for each item and simple ΣRank score for each category. Based on the ΣRankPoint scores, the top ten items in categories 1, 2, 3, 4, 7, 8, and 9 and the top eight items in categories 5

and 6 were identified, and the rest were eliminated from further analysis. During the analysis of categories 5 and 6, the researcher identified only eight emerging themes in each category, and all eight were included for analysis.

In round 3, the panelists again received a combination feedback/input form and were asked to review the summary descriptive statistical data from round two and to again rate and rank the categories and items within each category. Two successive rounds of rating and ranking were necessary to achieve a final consensus of those quality indicators the panelists perceived as most important for professional pilot programs.

Final data analysis after round three was completed through mean ratings, ΣRank scores and rank ordering for categories, ΣRankPoint scores and rank ordering for items within categories, and tier analysis based on ΣRank and ΣRankPoint score clustering and gaps. These types of statistics have been determined appropriate for use in quantitative descriptive analysis with the Delphi technique (McCampbell & Stewart, 1992). This scoring and analysis model was patterned after the one used by Ausburn (2002, 2003) in Delphi studies of perceptions of educational issues held by panels of teachers.

CHAPTER IV

FINDINGS

Summary of the Study

The purpose of this study was to identify the quality indicators that comprise an exceptional collegiate professional pilot program as identified by a panel of experts in aviation higher education. Over the course of three rounds of input, a panel of aviation education experts identified their perceived quality indicators in nine pre-determined and one miscellaneous category. These quality indicators could be useful in developing criteria for rating professional pilot programs and could assist in the development of standards for those programs.

Research Question

Panelists responded to the following question:

What are the perceived quality indicators that identify an exceptional professional pilot program in higher education in the following areas?

1. Facilities
2. Equipment and technology
3. Faculty
4. Flight/Administrative/Staff Support
5. Government (FAA) compliance

6. Student organizations
7. Completion rates
8. Assessment/Evaluation
9. Curriculum and Instructional Delivery
10. Miscellaneous

To answer this question, a three-round Delphi was conducted. A round one questionnaire was sent to the 16 aviation education experts who agreed to participate as panelists in this study. Two panelists failed to respond to the round one questionnaire and did not reply to follow-up email and telephone contact. A third panelist submitted an incomplete round one questionnaire and did not respond to the researcher's request for completed input. The remaining 13 panelists provided complete input to all three rounds of questionnaires, resulting in a 100 percent participation rate for this panel of 13 experts.

In round one, the 13 participating aviation experts provided a list of 357 items or recommendations within the nine specified categories and one miscellaneous category. After constant comparison analysis of the items submitted, a total of 166 items were identified as falling within the nine categories; miscellaneous items from category ten were determined to fall within the other nine categories and were re-categorized accordingly.

In round two, the panelists were provided a listing of the 166 categorized items and the frequency with which each item was listed in round one. Panelists were asked to rate the categories and the items within the categories on a five-point Likert-type scale with the number that best corresponded with their

determination of importance. The five-point scale was very important or 5; important or 4; moderately important or 3; somewhat important or 2; not important or 1. Next, panelists were asked to rank order the categories and the items within the categories in descending order, with the first choice listed as rank 1 and the *nth* choice listed as rank *n*. Of the 13 panelists receiving round two, all responded with category and item-within-category ratings and rankings.

Round three included a list of the top 10 ranked items from round two for categories 1, 2, 3, 4, 7, 8, and 9 and the top 8 ranked items for categories 5 and 6, as generated by the panelists from round two. The top ranked items in each category were selected by assigning "rank points" to each item as follows:

Rank 1 = 10 points
Rank 2 = 9 points
Rank 3 = 8 points
Rank 4 = 7 points
Rank 5 = 6 points
Rank 6 = 5 points
Rank 7 = 4 points
Rank 8 = 3 points
Rank 9 = 2 points
Rank 10 = 1 point
Rank below 10 = 0 points

The rank points earned by each item were summed, to compute the "sigma rank points" or ΣRankPoint score. Based on their ΣRankPoint scores, the items in each category were ranked from high to low and were assigned item numbers corresponding to the rankings of their scores. Thus, item number 1 became the item with the highest ΣRankPoint score and the highest rank order (#1). Items ranked below 10 were eliminated from further analysis in the study. Also tabulated was the number of times each item was ranked 10 or above by a

panelist regardless of the ranking assigned, which was designated as the "frequency" (f) score for the item (excluding categories 5 and 6 which only had 8 items each). For each category and each item within the category, a mean rating of importance was calculated. Also calculated was a total of the category's rankings (ΣRank) and its overall group ranking based on this total. Of the 13 panelists receiving round three, all responded with their final ratings and rankings in all nine categories.

The ΣRank and ΣRankPoint scores provided the clearest indicator of cluster rankings both in the category analysis and the analysis of items within categories. Tier analysis was performed to identify major break points or score clusters in the ΣRank scores of the categories and the point ranges within and between each tier level. Tier levels in Tables 2 through 10 are delineated by a dotted line between each tier level. Final data analysis of round three input for the nine categories included the mean rating for importance for each category, the ΣRank score for each category, and the final overall ranking for each category as shown in Table 1. All panelists ranked the Faculty category as being the most important; this was the only category of the nine categories that received a perfect mean rating of 5.0.

Table 1

Final Analysis: Mean Ratings, Rankings, and Tiers of Criterion Categories

Category	Mean Rating	ΣRank	Final Rank
Faculty	5.00	17	1
Equipment &Technology	4.54	35	2
Curriculum & Instructional Delivery	4.69	43	3
Government (FAA) Compliance	4.46	57	4
Facilities	4.00	71	5
Assessment & Evaluation	4.00	73	6
Flight/Administrative/ Staff Support Services	3.80	74	7
Completion Rates	3.31	101	8
Student Organizations	2.46	113	9

Final data analysis for each item within each category included the mean rating for importance for each item, the ΣRankPoint scores for each item, and the final rank order for each item as shown in Tables 2 through 9. Tier analysis was performed to identify major break points or score clusters in the ΣRankPoint scores of the items and the point ranges within and between each tier level. Tier levels are delineated by a dotted line between each tier level.

Table 2

Final Analysis – Faculty (Category Ranking = 1, N=13)

Item	Mean	ΣRankPt	Final Rank
1) Provide sufficient flight and ground instructors to provide adequate training opportunities for the number of students in the program.	4.54	111	1
2) Aviation faculty pay should be adequate to attract high quality persons and should be commensurate with other positions at the institution.	4.77	98	2
3) Faculty should include a group of career instructors who are willing to stay for the long term, highly motivated, and committed to student success.	4.23	96	3
4) Junior low time flight instructors need to be mentored and closely watched by the more experienced.	4.38	93	4
5) Full-time faculty should have a master's degree or higher.	4.08	72	5
6) Faculty should be a mix of persons with industry, military, airline, corporate and general aviation experience.	3.92	69	6

Table 2 (continued)

Final Analysis – Faculty (Category Ranking = 1, N=13)

Item	Mean	ΣRankPt	Final Rank
7) Program should encourage continuing professional development including participation in national aviation organizations (i.e., AOPA, NAFI, UAA, CAA/AABI, EAA, etc.)	3.69	58	7
8.5) Faculty should contain a mix of doctoral level professors with appropriate educational and industry credentials.	3.62	42	8.5
8.5) The Chief CFI and Assistant CFIs should have several years experience in the aviation industry in either the military, corporate, Parts 121, 135, etc.	3.62	42	8.5
10) Some faculty should do research and have the opportunity to publish.	3.38	41	10

The ΣRankPoint scores provided the clearest indicator of tier rankings in the analysis of items within the Faculty category as shown in Table 2. This category had 10 items with items 8 and 9 receiving tied rankings (8.5) and having identical mean ratings for importance and identical ΣRankPoint totals.

The item ranked most important or number 1 concerned providing sufficient instructors for the number of students in the flight program. One panelist stated that the "number of faculty would be dependent on the number of students and aircraft." Although the item ranked number 1 had a mean rating for importance of 4.54 and had the clear distinction of being ranked the most important of the ten ranked items, the item ranked 2 had a higher mean rating for importance of 4.77 which is also the highest mean rating for importance in this category. Item 2 concerned two distinct issues: (1) "aviation faculty pay should be adequate to attract high quality persons" and (2) "should be commensurate with other positions at the institution."

Panelists rated the item ranked 3 as important (4.23) in that faculty should include a group of career instructors who are "willing to stay for the long term, are highly motivated, and committed to student learning and success." Items 3 and 4 ranked within two ΣRankPoints of each other, but item 4 had a higher mean rating for importance of 4.38 versus 4.23 for item 3. The item ranked 4 concerned the issue regarding the use of less experienced or junior low time flight instructors who are primarily graduates and graduate students. One panelist stated:

> The industry probably cannot get along without the junior low time flight instructors that are used by all of us to achieve the goals of flight training but these people need to be mentored and closely watched by the more experienced people in leadership.

It is not unusual for collegiate professional pilot flight training programs to use less experienced graduates and graduate students to supplement the availability of flight training hours. Consequently, both Items 1 and 4 express a concern for providing the necessary training opportunities or flight time needed by student pilots to successfully complete the requirements of the program.

For the item ranked 5, panelists rated as important (4.08) the statement that "full-time faculty should have a master's degree or higher." Items ranked 5, 6, and 8.5, with mean ratings for importance of 4.08, 3.92 and 3.62 respectively, all concerned the need for a mix of faculty having both varied industry experiences as well as certain educational levels.

The item ranked 7 with a mean rating for importance of 3.69 pertained to professional development, and panelists stated that aviation programs should encourage professional development, including participating in national aviation organizations.

Finally, the item ranked 10 received the lowest mean rating for importance of 3.38. This item stated that some faculty should do research and have the opportunity to publish.

Table 3

Final Analysis – Equipment and Technology (Category Ranking = 2, N=13)

Item	Mean	ΣRankPt	Final Rank
1) Aircraft should include both single and multi-engine which are IFR capable and carry IFR capable GPS in addition to VOR.	4.46	111	1

Table 3 (continued)

Final Analysis – Equipment and Technology (Category Ranking = 2, N=13)

Item	Mean	ΣRankPt	Final Rank
2) Program should have adequate aircraft in types and numbers for the number of students enrolled.	4.69	110	2
3) Program should have equipment that is well-maintained, clean and reflects a professional flight operation.	4.38	89	3
4) Program should have flight simulators, e.g., FTD, PCATD, and/or Level-3 Sims, capable of replicating all aircraft types including turbine aircraft simulation.	4.23	88	4
5) Aircraft should be both TAA and conventional instrumentation.	3.85	83	5
6) Program should have access to up-to-date publications from the government and Jeppeson concerning NOTAMS, Advisory Circulars, AFD, Approach and Enroute information and other FAA databases.	4.15	64	6
7) There should be weather and DUAT access at the airport.	4.31	57	7
8) Classrooms should have state of the art			

Table 3 (continued)

Final Analysis – Equipment and Technology (Category Ranking = 2, N=13)

Item	Mean	ΣRankPt	Final Rank
technology including but not limited to: computers, VHS, Web CT, DVD, audio/ visual and multi-media capabilities, internet access (wired and wireless) and/or fiber-optic network connection.	3.85	54	8
9) A system needs to be in place to budget for technology upgrades.	4.08	37	9
10) Institution/industry interface should be fostered to facilitate the acquisition of equipment and technology.	3.69	23	10

As previously indicated, the ΣRankPoint scores provided the clearest indicator of tier rankings in the analysis of items within the Equipment and Technology category (Table 3). This category had 10 ranked items with no tied rank scores.

Items ranked 1 and 2 comprised the top-most tier with almost identical ΣRankPoint scores, 111 and 110 respectively. Although item 1 had a higher ΣRankPoint total by one point than item 2, item 1 had a lower mean rating for importance of 4.46 than item 2. Item 2 had the highest mean rating for importance in this category of 4.69. Items ranked 1, 2, 4, and 5 respectively

relate to the requirement for flight training programs to have aircraft types that includes various levels of avionics, i.e., aviation electronics. The types of aircraft used in professional pilot training programs vary from flight program to flight program with some programs having more technologically advanced aircraft (TAA) than others. In addition, some programs have flight simulators while others do not.

Panelists ranked item 3 as important in that a program should have equipment that is well-maintained, clean, and reflects a professional flight operation. Although this item had a mean rating for importance of 4.38, only two comments overall were provided by panelists relative to this item, both expressing a need for equipment that is maintained.

Items ranked 6 and 7 received a mean rating for importance of 4.15 and 4.31 respectively. Both items were concerned with student access to specific government and non-government publications, which provide students with needed information and data concerning weather (DUATS), regulatory requirements, and operational issues (NOTAMS, Advisory Circulars, AFD, and Approach and Enroute information).

The item ranked 8 by the panelists received a mean rating for importance of 3.85 or between moderately important to important. This item concerned the need for classrooms to have the latest technology. Although this mean rating for importance was the second lowest in this category, panelists provided 23 overall comments and mentioned amenities such as “smart classrooms,” “state of the art classrooms,” and “multi-media classrooms.” The need for staying up with the

latest technology was indicated in the item ranked 9 in that a system needs to be in place to budget for technology upgrades. This item received a higher mean rating for importance (4.08) than item 8 (3.85).

The item ranked 10 concerned the need for institution/industry interface to facilitate the acquisition of equipment and technology. Item 10 received a mean rating for importance of 3.69 in the Equipment and Technology category. Within collegiate flight training programs, faculty often consider the economic support provided by industry as essential for a flight training program to remain current and competitive in terms of both meeting the needs of the aviation students and the needs of future employers. One panelist stated, "Learning in Piper products throughout the program will not prepare them [students] for the variations in aircraft operating characteristics and systems they will face in the future."

Table 4

Final Analysis – Curriculum and Instructional Delivery (Category Ranking = 3, N=13)

Item	Mean	ΣRankPt	Final Rank
1) Instructional delivery must challenge the student to apply information to real-world scenarios not just rote recall of facts.	4.77	111	1
2) A desired curriculum should be designed to meet the institution's mission statement and objectives, and be specific to the location			

Table 4 (continued)

Final Analysis – Curriculum and Instructional Delivery (Category Ranking = 3, N=13)

Item	Mean	ΣRankPt	Final Rank
of the program.	4.54	108	2
3) The professional pilot curriculum should achieve objectives well beyond the requirements of FAA certification and should provide the student with values, skills and understanding not typically achieved by a student with a non-aviation degree who learned to fly at an FBO.	4.62	96	3
4) Students should be taught more than the minimum level required for certification.	4.77	82	4
5) The curriculum should be constantly reviewed by faculty for changes based on industry needs, changing conditions, and improvements from the evaluation program.	4.38	77	5
6) The curriculum should prepare students for written and verbal communication, math, science and computer science in addition to aviation core courses.	4.23	57	6
7) The college or university should be accredited by their regional accrediting body and the aviation program should be accredited by CAA/AABI.	3.85	52	7

Table 4 (continued)

Final Analysis – Curriculum and Instructional Delivery (Category Ranking = 3, N=13)

Item	Mean	ΣRankPt	Final Rank
8) The curriculum should be rigorous, inspire life-long learning, values-centered, and prepare students to make a difference.	3.69	51	8
9) An aviation advisory committee is important in providing information about industry needs and trends to assure that students are trained on the necessary skills.	3.92	45	9
10) There should be a variety of curriculum delivery modes using both technology and traditional instruction modes.	3.92	36	10

The ΣRankPoint scores provided the clearest indicator of tier rankings in the analysis of items within the Curriculum and Instructional Delivery category (Table 4). This category had 10 ranked items with no tied rank scores.

The item ranked 1 had a mean rating for importance of 4.77 and stated that instructional delivery must challenge the student to apply information to real-world scenarios not just rote recall of facts. One panelist remarked, "A rote recall of the facts is not acceptable for the college level." Another panelist stated:

> The program needs to help them [students] develop learning skills they will be using later on in their careers. For instance they need to have

(and be sold on the concept) of transferring skills from partial task trainers and other training devices to actual fight situations.

Although item 1 was the top ranked item in the first cluster, it shared a mean rating for importance of 4.77 with item 4 in the third tier.

The item ranked 2 received a mean rating for importance of 4.54 which was less than the mean ratings of items 3 and 4 of 4.62 and 4.77 respectively. Item 2 stated that a desired curriculum should be designed to meet the institution's mission statement and objectives, and be specific to the location of the program. One panelist stated:

> There are many different and legitimate paths to pilot certification. Therefore, it is critical that the curriculum is written to meet the school's objectives for the students. A 'one size fits all schools' or 'this is the way we have always done it' approach is not effective.

Another panelist remarked that, "A quality program is one that can demonstrate it is achieving the objectives it purports to achieve and is structured in a manner that allows achievement of the objectives of the program."

The items ranked 3 and 4 received a mean rating for importance of 4.62 and 4.77 respectively, and both items relate to flight training curriculum that achieves objectives beyond the requirements of FAA certification. Item 3 stated that "curriculum should provide students with values, skills, and understanding not typically achieved by a student with a non-aviation degree who learned to fly at an FBO (fixed-based operator)." Items 3 and 4 are related in that item 4 stated that students should be taught more than the minimum level required for

certification. One panelist stated, “At the college level it is critically important that the students be taught the hows and whys, not just a minimum level required for certification.”

The item ranked 5 stated that the curriculum should be constantly reviewed by faculty based on industry needs, changing conditions, and improvements from the evaluation program. This item received a mean rating for importance of 4.38. The need for industry involvement to ensure that curriculum meets its needs is also reflected in item 9 regarding the importance of providing information about industry needs and trends to ensure that students are trained on the necessary skills. Within collegiate professional pilot training programs, advisory boards can provide the necessary industry connection that allows a training program to maintain its viability.

According to the item ranked 6, the curriculum should prepare students for written and verbal communication, math, science, and computer science in addition to core courses. This item received a mean ranting for importance of 4.23. This statement suggested that students studying to become professional pilots need both the soft skills (frequently associated with communication skills) to complement the required technical skills.

The item ranked 7 by the panelists received a mean rating for importance of 3.85 between moderately important to important. Several comments were provided concerning accreditation of aviation programs. One panelist remarked, “A college or university should be accredited by their regional accrediting body. Aviation programs should be accredited by CAA/AABI [Council on Aviation

Accreditation, now known as the Aviation Accreditation Board International]." Another panelist stated, "Accreditation by the Council on Aviation Accreditation is an important indicator, as would membership in the University Aviation Association." The AABI is recognized by the CHEA as a Specialized Accrediting Body. There are 22 colleges and/or universities with aviation programs that are currently accredited by AABI, and there are 11 candidates working toward attainment of accreditation.

The item ranked 8 received a mean rating for importance of 3.69, which was the lowest rating received in the Curriculum and Instructional Delivery category. This item stated that curriculum should be rigorous, inspire life-long learning, values-centered, and prepare students to make a difference.

According to the item ranked 9, the existence of an aviation advisory committee is important in providing current information about industry needs and ensuring that students have the necessary skills. This item received a mean rating for importance of 3.92 which tied item 10 for importance. One panelist stated, "industry advisory committees help guide curriculum to the needs of industry." Another panelist stated, "Close ties to industry (airlines, cargo, military, and law enforcement) allow interaction between students and those in the career field."

Finally, the item ranked 10 specified that there should be a variety of curriculum delivery modes using both technology and traditional instruction modes. This item received a mean rating for importance of 3.92. One panelist stated that the curriculum should include "optimized curriculum delivery modes to

promote learning." Another panelist stated, "It is important not to confuse instructional delivery with instructional technology. Having the technology does not guarantee effective delivery. Delivery can also be very effective without instructional technology." A third panelist stated that curriculum delivery methods should include a mix of "web-based, computer-based training, classroom, small group and one-on-one" instruction. A fourth panelist commented that instructional delivery could be effective without teaching to different student learning styles.

Table 5

Final Analysis – Government/FAA Compliance (Category Ranking = 4, N=13)

Item	Mean	ΣRankPt	Final Rank
1) FAA/government compliance is mandatory.	4.92	128	1
2) There should be an in-house safety officer, reporting and feedback system.	4.00	107	2
3) There should be a good working relationship with the FAA Principal Operations Inspector including regular visits, consultations, and safety training.	4.54	100	3
4) There should be a self-auditing mechanism in place that will help keep records in compliance with FAA requirements.	4.31	91	4
5) There should be flight instructor refresher training programs separate from the			

Table 5 (continued)

Final Analysis – Government/FAA Compliance (Category Ranking = 4, N=13)

Item	Mean	ΣRankPt	Final Rank
regulatory requirements.	3.62	76	5
6) Government compliance is a must; however, the regulations under which the program is conducted are not critical, i.e., Part 61 v. Part 141/142 approved.	3.23	63	6
7) The flight school should be FAR Part 141/142 approved.	3.54	62	7
8) The flight school should be FAA FITS approved.	3.00	46	8

Again, the ΣRankPoint scores provided the clearest indicator of tier rankings in the analysis of items within the Government/FAA Compliance category (Table 6). This category had 8 ranked items with no tied rank scores.

Item 1 was clearly the top-ranked item in tier one by 21 ΣRankPoints over item 2 in tier two. Item 1 stated that FAA/government compliance is mandatory and it received a mean rating for importance of 4.92, the highest rating in this category. One panelist stated the need for "absolute compliance with FAA rules and regulations both in flight and maintenance areas." A second panelist commented that "programs have to have a high focus on compliance and safety." And, a third panelist said, "Government compliance is mandatory and the program should be working closely with FAA offices to offer training

sessions and to participate in safety programs. FAA standards are the minimum requirements. Quality programs should be seeking higher standards."

In addition, the items ranked 6 and 7 relate to the issue of FAA/government compliance required in item 1. These items received a mean rating for importance of 3.23 and 3.54 respectively, and indicated that (1) government compliance is a must; however, the regulations under which the program is conducted are *not* critical, i.e., FAR Part 61 vs. FAR Part 141/142 approved, and (2) the flight school *should* be FAR Part 141/142 approved. Although these comments differ concerning the regulation under which a training program should operate (FAR Part 61 vs. FAR Part 141/142), both statements represent a need for quality collegiate aviation programs to be in compliance with government/FAA regulations.

Although item 2 exceeded items 3 and 4 in total ΣRankPoints, item 2 received a lower mean rating for importance of 4.00, whereas items 3 and 4 received a mean rating of 4.54 and 4.31 respectively. Item 2 stated that there should be an in-house safety officer, reporting and feedback system. One panelist stated the need for a "written safety program for ground and flight." Another panelist stated, "Most programs I have seen do not have a designated and functioning safety manager."

The item ranked 3 is also an issue that concerns safety. This item received a mean importance rating of 4.54. One panelist stated that, "the program should be working closely with FAA offices to offer training sessions and to participate in safety programs." A second panelist said that a program should

have “a good working relationship with the FAA Principal Operations Inspector including regular visits and consultations.”

The item ranked 4 received a mean rating for importance of 4.31. This item stated a need for a self-auditing mechanism to keep records in compliance with FAA requirements.

The item ranked 5 received a mean rating for importance of 3.62. This item stated a need for flight instructor refresher training separate from FAA regulatory requirements.

The items ranked 6 and 7 received a mean rating for importance of 3.23 and 3.54 respectively. Both items concern the issue about which FAA regulation should drive the operation of collegiate flight training programs. Comments pertaining to this issue relate to certification and operation of collegiate flight programs under FAR Part 141 or under FAR Part 61. Aviation flight training programs can be certified under either FAR Part 141 or under FAR Part 61. Programs certified under FAR Part 141 provide students with a standardized training syllabus and lesson plans approved by the FAA, and in which all necessary skills are taught in a specific order. Under FAR Part 61, collegiate aviation programs are less structured and not subject to FAA approval. Faculty at Part 61 schools can design lesson plans tailored to individual student needs. However, since regulations under Part 61 are less strict, students are required to perform more than the minimum flights hours to obtain a certificate or rating. For example, a commercial pilot certificate may be obtained in 190 hours of flight time under Part 141 rather than 250 hours under Part 61. One panelist stated,

"FAA/government compliance is a must; however, the regulations under which the program is conducted are not critical." Another panelist made a similar statement: "The school absolutely would not have to be a Part 141 school. That regulation was not written for collegiate flight programs and in the past has inhibited development of appropriate curricula." However, a third panelist said, "[The] flight school should be FAR 141 and 142 approved." FAR Part 142 applies to the certification of flight training centers authorized by the FAA to provide flight training by flight simulator instead of actual aircraft.

The item ranked 8 received a mean rating for importance of 3.00 or moderately important. This item pertains to FAA approved flight programs (under Part 141) that want to provide aircraft specific transition training under a non-regulatory program called FITS (FAA/Industry Training Standards). Panelists in the study stated that flight schools should be FAA FITS accepted (no FAA "approval" required). FITS is a partnership between FAA, academia, and the general aviation industry to develop new training standards for Technically Advanced Aircraft (TAA). Using a generic syllabus as a template, collegiate flight programs can create scenario-based, learner-focused training materials that emphasize practical application. Panelists in the study stated that flight schools should be FAA FITS accepted (no FAA "approval" required).

Table 6

Final Analysis – Facilities (Category Ranking = 5, N=13)

Item	Mean	ΣRankPt	Final Rank
1) Facility should have adequate space for			

Table 6 (continued)

Final Analysis – Facilities (Category Ranking = 5, N=13)

Item	Mean	ΣRankPt	Final Rank
individual briefings and debriefings.	4.54	103	1
2) Facility should have adequate flight planning space with current charts, approach plates, flight plans, weather information, etc.	4.54	90	2
3) Facility should have instrument approaches at or a short flight from home airport to include VOR, NDB, ILS and GPS.	4.38	82	3
4) Facilities should be personal yet represent a professional, well-maintained flight operation.	3.85	81	4
5) Hangar and maintenance facilities should allow for most maintenance functions to be done on an as needed basis keeping the fleet available to the students.	4.08	78	5
6) There should be appropriate and adequate airport classroom space for ground school.	3.77	66	6
7) Facilities should have adequate space for hangar maintenance and storage.	3.92	64	7
8) Facilities should have convenient access to a library collection of flight related information through a variety of mediums including			

Table 6 (continued)

Final Analysis – Facilities (Category Ranking = 5, N=13)

Item	Mean	ΣRankPt	Final Rank
manuals, publications, computers, telephone, etc.	3.46	58	8
9) Facility should have secure ramp space and secure airside access.	3.77	54	9
10) Facility should include a safe, suitable alternate field for practice approaches, landings, maneuvers, stall training, and simulated emergency landings.	3.00	45	10

The ΣRankPoint scores provided the clearest indicator of tier levels in the analysis of items within the Facilities category. Although item 1 was clearly the top-ranked item in tier one by 13 ΣRankPoints, the items ranked 1 and 2 shared the same mean rating for importance of 4.54. The item ranked 1 concerned having adequate space for individual briefings and debriefings. One panelist stated that there should be "adequate briefing rooms for pre and post flight meetings." Another panelist commented that adequate briefing space should "enable 'private' discussions of flights before and after the event."

The item ranked 2 was also related to the concern for adequate space but for space needed for flight planning purposes, with current charts, approach plates, flight plans, and weather information.

Item 3 received a mean rating for importance of 4.38. This item stated a need for a facility to have instruments approaches either at or a short distance

from the home [school] airport that included approaches for VOR, NDB, ILS, and GPS. Two panelists commented that the Facility should specifically include a "certified GPS approach and ILS approach."

Item 4 received a mean rating for importance of 3.85, which was lower than the 4.08 mean rating received by item 5. However, item 4 received 9 separate comments concerning the need for Facilities to be personal yet represent a professional, well-maintained operation. One panelist stated that an "Enormous 'State' university can tend to swallow the individual and make the experience less personal. With the challenges of flight training as they are, the disconnectedness associated with large scale programs can add unnecessary challenges." Another panelist stated that "The facilities should have all the elements needed to give the student an understanding and appreciation for a professional flight operation." A third panelist commented that "The appearance of the facilities is a reflection of the program overall."

Item 5 concerned the availability of hangar and maintenance facilities that should allow for most maintenance functions to be done on an as needed basis keeping the aircraft available to the students for flight training. This item received a mean rating for importance of 4.08.

Item 6 received a mean rating for importance of 3.77. This item indicated the need for Facilities to have appropriate and adequate airport classroom for ground school. One panelist listed the need for "dedicated classrooms."

Item 7 concerned the need for adequate space for hangar maintenance and storage. All six of the comments regarding item 7 specifically used the

adjective “adequate” when referring to hanger maintenance and storage, but did not define or describe what “adequate” would look like.

The item ranked 8 by the panelists received a mean rating for importance of 3.46. This item related to the need for Facilities to have convenient access to a library of flight information through a variety of media including paper copies, computer, and telephone. One panelist referred to this as a need for a “resource center” and three other panelists referred to the need for a “library.”

Item 9 received a mean rating for importance of 3.77. This item dealt with the need for secure ramp space and secure airside access. Although this item was rated in the top ten in the Facility category, it received only one comment. And, it was the only item in the Facility category that received any comment concerning security.

Item 10 concerned the need for the Facility to include a safe, suitable alternate field for students to practice approaches, landings, maneuvers, stalls, and simulated emergency landings. Item 10 received a mean rating for importance of 3.00.

Table 7

Final Analysis – Assessment/Evaluation (Category Ranking = 6, N=13)

Item	Mean	ΣRankPt	Final Rank
1) Assessments must address higher order learning and not just rote learning required for FAA knowledge and practical tests.	4.54	116	1
2.5) Program assessment and evaluation should			

Table 7 (continued)

Final Analysis – Assessment/Evaluation (Category Ranking = 6, N=13)

Item	Mean	ΣRankPt	Final Rank
result in continuous positive improvements to the program.	4.54	99	2.5
2.5) Evaluation of training should be conducted at predetermined points in the syllabus, including progress checks and end of course checks.	4.31	99	2.5
4) Assessment and evaluation are essential parts of an outstanding program and have to be used in conjunction with specific statements of desired outcomes of the program.	4.08	86	4
5) CAA or regional accreditation is desirable.	3.92	75	5
6) There should be a method to track training weakness for remediation.	4.15	63	6
7) Periodic external reviews by aviation educators or peers do much to tighten up a program.	3.62	57	7
8) Good schools will be able to point to satisfied employers who hire graduates and be able to provide names and contact numbers to prospective students.	3.69	56	8
9) Student evaluations of their flight instructors			

Table 7 (continued)

Final Analysis – Assessment/Evaluation (Category Ranking = 6, N=13)

Item	Mean	ΣRankPt	Final Rank
should be accomplished at the end of each semester whether the student completed the flight course or not.	3.23	37	9
10) Factors such as weather, instructor staffing, enrollment numbers, and maintenance availability need to be considered when determining completion rates.	3.15	27	10

The ΣRankPoint scores provided the clearest indicator of tier rankings in the analysis of items within the Assessment/Evaluation category. Item 1 was clearly the top ranked item exceeding the second tier of items 2.5 by 17 ΣRankPoints, yet item 1and the first item ranked 2.5 received identical mean ratings for importance of 4.54. For Item 1, panelists stated that assessment of a quality program must address higher order learning and not just learning required to pass the FAA tests (both written and practical).

The first item ranked 2.5 addressed the need for program assessment and evaluation which results in continuous positive improvements. One panelist stated that a quality program "should have a comprehensive assessment program to provide feedback to affect changes in the academic program."

Another panelist commented that a quality program needs a “mechanism and willingness to review the outcomes for purposes of program improvement.”

The second item ranked 2.5 concerned the need for evaluation of training at predetermined points in the syllabus, including during student progress checks and end of course checks.

Item 4 received a mean rating for importance of 4.08 in tier 2. Panelists perceived assessment and evaluation as essential parts of an outstanding program to be used with statements of desired program outcomes. One panelist stated that “Since the assessment standards are set by the FAA, I think it would be difficult to compare programs with this measurement.”

The item ranked 5 concerned the need for CAA (now AABI) or regional accreditation. This item received a mean rating for importance of 3.92 in tier 4. The panelists who provided this recommendation also provided the recommendation in item 7 that periodic external reviews by aviation educators or peers could do much to tighten up or strengthen a program. Item 7 received a mean rating for importance of 3.62 in tier 5.

Item 6 had the second highest mean rating for importance of 4.15 in the Assessment/Evaluation category, tier 5. This item concerned the need for a method to track training weakness for remediation and improvement purposes.

Item 8 had a mean rating for importance of 3.69, and was also in tier 5. Panelists believed that good schools should be able to identify satisfied employers who hired graduates and provide this information to prospective students.

Tier 6 contained items 9 and 10. Item 9 received a mean rating for importance of 3.23. Panelists perceived that students should evaluate their flight instructors at the end of each semester regardless of whether the student completed the flight course or not. Item 10 received a mean rating for importance of 3.15, and concerned the need for factors such as weather, instructor staffing, enrollment numbers, and maintenance availability to be considered when determining student completion rates.

Table 8

Final Analysis – Flight/Administrative/Staff Support (Category Ranking = 7,N=13)

Item	Mean	ΣRankPt	Final Rank
1) There should be adequate administrative support to service the number of students and staff.	4.46	110	1
2) Support staff should be adequate to provide oversight of flight operations and assure compliance with regulations, operating procedures and adherence to the syllabus.	4.46	109	2
3) There should be a documented aviation safety program with a safety committee responsible for investigating incidents and reporting hazards.	4.62	96	3
4) There should be adequate dispatch personnel			

Table 8 (continued)

Final Analysis – Flight/Administrative/Staff Support (Category Ranking =7, N=13)

Item	Mean	ΣRankPt	Final Rank
to support the schedule, the level and the type of flight activities.	4.46	92	4
5) Flight staff and administration must have an understanding of the peculiarities of an aviation training program.	4.31	85	5
6) Administration must support the cost of airplane and training device maintenance.	3.92	51	6
7) There should be administrative capability to handle recordkeeping to 14 CFR 141 standards, and billings to Veteran's Administration standards.	3.69	50	7
8) Aviation students should have access to all university student support services as well as an industry mentor to guide and counsel them.	3.69	45	8
9) A flight organization should have a: Director of Flight Ops (may be the Chief CFI); Administrative Secretary (recordkeeping); Administrative Assistant (assist secretary); Director of Maintenance; and adequate dispatchers.	4.00	41	9
10) Faculty should be supported by the following positions/services: Flight Scheduler; Flight			

Table 8 (continued)

Final Analysis – Flight/Administrative/Staff Support (Category Ranking =7, N=13)

Item	Mean	ΣRankPt	Final Rank
Dispatcher; Flight Secretary; Faculty Secretary; Research Faculty Secretary; Administrative Secretary; Safety Director; Chief Flight Instructor; aircraft maintenance; building supervisor; and fuel services for aircraft.	3.38	36	10

The ΣRankPoint scores provided the clearest indicator of tier rankings in the analysis of items within the Flight/Administrative/Staff Support category. Only one ΣRankPoint separated items 1 and 2 in tier 1. Items1, 2, and 4 shared the same mean rating for importance of 4.46, but item 3 in tier 2 had the highest mean rating for importance in this category of 4.62. In item 1, panelists indicated that there should be adequate administrative support to service the number of students and staff. Item 2 also reflected the need for adequate support staff, but included the specific areas of support for oversight of flight operations, regulatory compliance, operating procedures and adherence to the syllabus. Panelists used adjectives such as “sufficient,” “adequate,” and “necessary” to describe the level of administrative support required for a quality program for both items 1 and 2, but did not define or describe adequacy.

Item 3 in tier 2 concerned support for a documented aviation safety program with a safety committee that would be responsible for investigating

incidents and reporting hazards. This item had the highest mean rating for importance in this category of 4.62. No additional comments were provided by the panelists.

Item 4, in tier 2, shared a mean rating for importance of 4.46 with items 1 and 2. One panelist stated that a flight program "should have adequate dispatch support to keep track of aircraft and coordinate with the maintenance staff." A second panelist commented that there should be "Dispatch oversight 24/7. May be on an on-call basis if nothing is presently scheduled." A third panelist stated that

> A number of dispatchers who allow the operation to fly from approximately 07:00AM to 11:00PM depending of course on the SOP [standard operating procedure] of the individual flight school. The dispatchers allow operational control of the operations and are a major safety factor in flight operations.

The item ranked 5, in tier 3, concerned the need for flight staff and administration to have an understanding of the peculiarities of an aviation training program. This item received a mean rating for importance of 4.31. No additional comments were provided by the panelists.

Item 6, in tier 4, received a mean rating for importance of 3.92. This item concerned the need for administration support for the cost of airplane and training device maintenance. One panelist stated that "These items are expensive and the maintenance is costly. The administration must expect proper maintenance to be done and be willing to pay the cost." A second panelist

commented “A highly qualified maintenance team should be built up and supported.” A third panelist stated that a quality program “should have adequate maintenance support to keep aircraft fleet in good operating condition.”

Item 7, also in tier 4, received a mean rating for importance of 3.69. This item concerned the need for administrative capability to handle recordkeeping to 14 CFR standards, and billings to Veteran’s Administration standards.” No additional comments were provided by the panelists.

Item 8, in tier 5, also received a mean rating for importance of 3.69. Panelists expressed a need for aviation students to have access to all university support services as well as an industry mentor for guidance and counseling. No additional comments were provided by the panelists.

The item ranked 9, in tier 5, received a higher mean rating for importance that item 8. This item received a mean rating of 4.0. Panelists stated that a quality flight operation should be comprised of a Director of Flight Operations (may be the Chief Flight Instructor); Administrative Secretary (recordkeeping); Director of Maintenance; and adequate dispatchers. No other comments were provided by the panelists.

In item 9, tier 5, panelists addressed the composition of flight faculty support personnel. This item received a mean rating for importance of 3.38. Panelists stated that faculty should be supported by a flight scheduler; flight dispatcher; flight secretary; faculty secretary; research faculty secretary; administrative secretary; safety director; chief flight instructor; aircraft

maintenance; building supervisor; and fuel services for aircraft. No additional comments were provided by the panelists for item 9.

Table 9

Final Analysis – Completion Rates (Category Ranking = 8, N=13)

Item	Mean	ΣRankPt	Final Rank
1) Completion rates should be monitored but not the sole measure of program integrity.	4.38	108	1
2) Flight courses should be treated like regular university courses with multiple sections scheduled Monday-Friday and capped enrollment to ensure availability of aircraft and instructors.	4.00	91	2
3) The final degree is the ultimate goal.	3.92	88	3
4) Completion rates are dependent on sufficient instructors and airplanes.	3.92	84	4
5) Programs that select highly motivated students only tend to have higher completion rates.	4.00	83	5
6) Completion rates could be enhanced by using bad weather days to accomplish supplementary ground schools that should be part of each flight course.	3.85	63	6

Table 9 (continued)

Final Analysis – Completion Rates (Category Ranking = 8, N=13)

Item	Mean	ΣRankPt	Final Rank
7) Completion rates could be enhanced by charging flight fees at the beginning of the semester to help students budget.	3.38	55	7
8) High student success rates on FAA flight examinations are an indicator of completion rates.	3.38	52	8
9) Programs should have a minimum ACT/SAT score for incoming students to ensure success.	2.85	46	9
10) Completion rates are a useful indicator, but an appropriate completion rate is difficult to determine.	3.23	45	10

The ΣRankPoint scores provided the clearest indicator of tier rankings in the analysis of items within the Completion Rates category. This was also the first category in which an item within a category (item 9) received a meaning rating for importance that fell below 3.0 (moderately important).

Item 1, tier 1, was clearly the top ranked item exceeding item 2 in the second cluster by 17 ΣRankPoints. Item 1 received a mean rating for importance of 4.38. Panelists commented that completion rates should be monitored but

should not be the sole measure of program integrity. No other comments were provided by panelists for this item.

Item 2, tier 2, received a mean rating for importance of 4.00. Panelists expressed a need for flight courses to be treated like regular university courses with multiple sections scheduled Monday-Friday and capped enrollment to ensure availability of aircraft and instructors. One panelist stated "Offer multiple sections of the class during the day, i.e., Private Pilot sec 001 is the first flight period, sec 002 is the second flight period, etc." Another panelist commented that flight courses should be "mandatory M-F class so as to not miss any flight opportunities."

Item 3, also in tier 2, received a mean rating for importance of 3.92. Panelists commented that "the final degree is the ultimate goal." No other comments were provided by the panelists for item 3.

Item 4, also in tier 2, also received a mean rating for importance of 3.92. Panelists commented that "completion rates are dependent on sufficient instructors and airplanes." No additional comments were provided by the panelists for item 4.

Item 5, the last item in tier 2, received a mean rating for importance of 4.0, the same mean rating as item 2. Panelists commented that programs that select highly motivated students only tend to have higher completion rates. No other comments were provided by the panelists for item 5.

Item 6, tier 3, received a mean rating for importance of 3.85. Panelists commented that completion rates could be enhanced by using bad weather days

to accomplish supplementary ground schools that are a part of flight course training. No other comments were provided by the panelists for item 6.

Item 7, tier 4, received a mean rating for importance of 3.38. Panelists commented that completion rates could be enhanced by charging flight fees at the beginning of the semester to help students budget for flight training. No additional comments were provided by the panelists.

Item 8, tier 4, received the same mean rating for importance of 3.38 as item 7 in this tier. Panelists stated that high student success rates on FAA flight examinations [include written, oral, and practical testing] are an indicator of completion rates. No other comments were provided by the panelists for item 8.

In item 9, tier 5, panelists commented that programs should have a minimum ACT/SAT score for incoming students to ensure success although no specific scores were mentioned. This item was the first item in this study to receive a mean rating for importance less than 3.00, at 2.85. No other comments were provided by the panelists for this item. No reasons were given for this perceived relative lack of importance of ACT/SAT scores in admitting students to pilot training programs. Additionally, no alternative entry tests were proposed.

The item ranked 10, tier 5, received a mean rating for importance of 3.23. Panelists commented that completion rates are a useful indicator of program quality, but also commented that an appropriate completion rate is difficult to determine. One panelist stated “If a school is getting more than a 50% completion rate, they are doing well.” A second panelist commented that

Completion rates need to be kept in perspective relative to the courses, i.e., some courses traditionally don't get done in a semester because of length, weather requirements, etc. However, completion rates are an important measurement of systematic success such as validity of the curricular structure and instructional effectiveness.

A third panelist stated that the completion rate should be "70 – 80% [when] obtaining private, commercial, instrument, multi-engine, CFI and CFII" ratings. Another panelist commented that "Although hard to quantify, a well-run flight curriculum should probably have completion rates in excess of 80% in five years." According to FAR Part 141, FAA approved flight schools must maintain at least an 80% first time pass rate for all graduates on FAA flight tests.

Table 10

Final Analysis – Student Organizations (Category Ranking = 9, N=13)

Item	Mean	ΣRankPt	Final Rank
1) Programs should be involved with and encourage participation in organizations like AOPA, 99's, EAA, NIFA, AHP, WIA, NAFI, MAAP, PAMA, and others to help students network with industry professionals.	3.62	118	1
2) Students should have the opportunity to practice leadership skills in any organi-zation, not necessarily aviation related.	3.62	115	2
3) There should be strong faculty interest			

Table 10 (continued)

Final Analysis – Student Organizations (Category Ranking = 9, N=13)

Item	Mean	ΣRankPt	Final Rank
and support for student organizations.	3.46	100	3
4) Programs should have a student organization with faculty advisor for each discipline represented in the division, i.e., NIFA, AAAE, AIAA, and Alpha Eta Rho.	3.23	84	4
5) Programs should have a formal student advisory board/council to serve as a liaison between students, faculty, and administration.	2.77	73	5
6) Participation in NIFA is important but not critical.	2.31	67	6
7) Good schools will have community outreach programs at the K-12 level, seminars for local pilots and recurrent training opportunities.	2.46	62	7
8) An aviation student organization is not necessary.	2.46	60	8

The ΣRankPoint scores provided the clearest indicator of tier rankings in the analysis of items within the Student Organizations category. Item 1 exceeded item 2 by only 3 ΣRankPoints, but both items received identical scores of 3.62 for mean rating for importance. All items in this category received

a mean rating for importance that indicated a level of importance between "somewhat important" and "moderately important" only, or 2.31 to 3.62.

In item 1, tier 1, panelists stated that aviation programs should be involved with and encourage participation in organizations like AOPA, 99's, EAA, NIFA, AHP, WIA, NAFI, MAAP, PAMA, and others to help students network with industry professionals. See Nomenclature list for meaning of acronyms. One panelist commented that "Student organizations are the link to the profession, professional activities, and enforce the self-image of the student as part of the chosen profession which enhances the learning experience." A second panelist stated that "Students should have the opportunity to engage in activities associated with their potential career field and student organizations are one of the ways in which they can do this."

Item 2, tier 1, received a mean rating for importance of 3.62, identical to item 1. In this item, panelists commented that students should have the opportunity to practice leadership skills in any organization, not necessarily aviation related. No other comments were provided by panelists for item 2.

Item 3, tier 2, received a mean rating for importance of 3.46. This item concerned the need for strong faculty interest and support for student organizations. One panelist commented that quality programs should have an aviation organization with "appropriate, committed faculty/staff oversight (advising)."

Item 4, tier 3, received a mean rating for importance of 3.23. Panelists commented that aviation programs should have a student organization with

faculty advisor for each discipline [organization] represented. One panelist stated that "These organizations need to have industry sponsors, engage in professional community activities, have internship connections, social functions, and generally develop the students' perspective on the industry focus." No other comments were provided by the panelists.

Item 5, tier 4, received a mean rating for importance of 2.77. Panelists commented that aviation programs should have a formal student advisory board/council to serve as a liaison between students, faculty, and administration. No other comments were provided by the panelists for item 5.

Item 6, tier 4, received a mean rating for importance of 2.31. Panelists stated that participation in NIFA is important but is not critical to the program. No other comments were provided by the panelists.

Item 7, tier 5, received a mean rating for importance of 2.46. Panelists commented that good schools will have community outreach programs at the K-12 level, seminars for local pilots, and recurrent training opportunities. No additional comments were provided by panelists for item 7.

In item 8, tier 5, panelists stated that an aviation student organization is not necessary for a quality flight program. One panelist commented "We don't have an aviation student organization. I'm interested to see what others do." Another panelist said

> Most professionally oriented student organizations do not draw a high percentage of the student body and are only important if the students do not have other opportunities. They are nice to have even if there are other

opportunities, but the value tends to be shared among a small percentage of the students.

Comments throughout the Student Organizations category frequently mentioned the same or similar aviation organizations as a desirable part of a flight training program.

Summary and Integration of Findings

Based on the findings of this study, the nine criterion categories are listed in descending order of perceived importance by the Delphi panel of experts (Table 11). Tier levels are delineated by a dotted line between each tier level. Tiers are defined by similar ΣRankPoint scores within a grouping and score gaps between groups.

Table 11

Categories in Descending Order of Perceived Importance by Delphi Panel (N=13)

Category	Mean	ΣRank Pt Total	Final Rank
Faculty	5.00	126	1
Equipment &Technology	4.54	108	2
Curriculum & Instructional Delivery	4.69	100	3
Government (FAA) Compliance	4.46	86	4
Facilities	4.00	71	5

Table 11 (continued)

Categories in Descending Order of Perceived Importance by Delphi Panel (N=13)

Category	Mean	ΣRank Pt Total	Final Rank
Assessment & Evaluation	4.00	70	6
Flight/Administrative/Staff Support Services	3.80	69	7
Completion Rates	3.31	42	8
Student Organizations	2.46	30	9

The 13 panelists clearly perceived the Faculty category to be the most important among the nine categories. The ΣRankPoint score totals provided the clearest indicator that panelists perceived Faculty as the most important of all nine categories, and make the Faculty category the sole category in tier one. Total ΣRankPoints for the Faculty category exceeded the next highest category, Equipment and Technology, by 18 points. In addition, the Faculty category was the only category that panelists rated a perfect 5.0 score for mean rating for importance. This suggests that panelists are in clear agreement about the importance of Faculty as a quality indicator of professional pilot training programs. Within the Faculty category, the top ten rated items received mean ratings for importance between 4.77 and 3.38, clearly an indication that factors such as sufficiency of faculty, parity of faculty pay, years and types of faculty experience, degree attainment level, professional development, and research opportunities might be indicative of quality indicators for professional pilot training programs. However, with the exception of degree attainment level (master's

degree or higher), panelists did not define or describe criteria for determining what constitutes “sufficient,” “adequate,” “mix of persons,” “appropriate,” or provide specific numbers that would be indicative of the composition of a quality Faculty.

Within tier two, the number two ranked category, Equipment and Technology, and number three ranked category, Curriculum and Instructional Delivery were separated by only eight ΣRankPoints. However, the Curriculum and Instructional Delivery category received a slightly higher mean rating for importance of 4.69 versus 4.54 for Equipment and Technology. These two categories, within tier two, were perceived by the panelists as being somewhat less important than tier one but relevant in importance in identifying a quality training program. The importance of Equipment and Technology was quite evident by panelists’ comments concerning having a variety of aircraft and aircraft with different instrument capabilities as an indicator of program quality. With the rapid advancement of aerospace technology, pilots who are trained and qualify in more than one aircraft type might have a greater potential for employment than pilots with lesser qualifications.

In the Curriculum and Instructional Delivery category, two items received a higher mean rating for importance than any of the items received in the Equipment and Technology category. Panelists perceived as important that Curriculum and Instructional Delivery should include real-world, scenario-based learning that provides student pilots with opportunities to practice technical skills. The four top-ranked items in this category relate to students being taught more

than just the basic practical skills required for FAA certification. Other areas considered important by the panelists as indicators of program quality included the need for curriculum evaluation and the inclusion of workplace skills training in the curriculum. However, panelists perceived accreditation of training programs, a variety of curriculum delivery modes, and industry input as moderately important to important.

Tier three was comprised of one category, Government (FAA) Compliance. While civilian pilot training is strictly regulated by the FAA, panelists perceived this category as less important than the Faculty, Equipment and Technology, and Curriculum and Instructional Delivery categories. This perception might be attributed to the mandatory nature of compliance that is ingrained in professional pilot training programs and that results in the overall acceptance of the inevitability of regulatory compliance. Other perceived areas of importance included the need for an in-house safety officer, a safety reporting system, and an auditing mechanism to ensure records comply with FAA requirements. Panelists listed as moderately important to important the need for flight instructor refresher training, and whether a flight training program should be conducted under FAR Part 61 v. Part 141/142.

Three categories comprise tier 4 and include Facilities, Assessment/ Evaluation, and Flight/Administrative/Staff Support Services. Panelists perceived the Facilities and the Assessment/Evaluation categories as almost equally important, both receiving a mean rating for importance of 4.0 and being separated by only one ΣRankPoint, 71 and 70 respectively. In the Facilities

category, panelists used adjectives such as “adequate”, “well maintained”, “suitable”, and “appropriate”, but did not define or describe these words in terms which included any specific criteria that might help determine quality indicators for this category. Statements provided by the panelists in the Assessment/Evaluation category did not contain specific criteria or measurements for assessing student and program performance. The Flight/Administrative/Staff Support Services category was slightly lower in importance than the Facilities and Assessment/Evaluation categories, receiving a mean rating for importance of 3.80 and a ΣRankPoint score of 69. Again, comments provided by panelists in this category included the adjective “adequate” to describe issues such as administrative support, oversight of flight operations, and dispatch personnel, but did not include specific criteria that might help determine quality indicators.

Finally, tier five included the Completion Rates and Student Organizations categories. Panelists perceived these two categories as the least important of the nine categories, receiving mean ratings for importance of 3.31 and 2.46, respectively (between somewhat important to important). Within the Completion Rates category, panelists agreed that completion rates should be monitored but are difficult to determine. Panelists suggested that completion rates could be enhanced by better utilization of resources and changing the timeframe when flight fees are charged to help students budget throughout the semester. Again, panelists did not offer any criteria for determining completion rates as a quality indicator for professional pilot training programs.

Student Organizations was the lowest rated and ranked category, receiving a mean rating for importance of 2.46 and was ranked nine. Although the panelists rated this category somewhat important to moderately important, there was strong agreement among the panelists that quality professional pilot training programs should encourage student participation in aviation-related organizations to promote student networking with industry representatives.

Among the nine prescribed categories, the mean ratings for importance ranged from a high of 5.00 (very important) to a low of 2.46 (somewhat important). With the exception of the Completion Rates and Student Organizations categories (tier five), the mean ratings for importance of the top seven categories, tiers one through four, might suggest that panelists have a clearer feel for quality indicators for pilot training programs in those top seven categories. In terms of identifying quality indicators, overall panelists provided their perceptions of best practices within each category. However, with a few exceptions, panelists did not propose benchmarks or measures for the best practices they identified, but rather provided comments that included descriptive words such as “adequate”, “appropriate”, “suitable”, and others. To augment the findings of this study, quality indicators for professional pilot training programs might need to include specific benchmarks for the best practices identified by the Delphi panelists. Using the best practices identified by the panelists, benchmarks could be determined for faculty, equipment and technology, curriculum and instruction, government compliance, facilities, assessment and evaluation, and support services, i.e., the categories ranked one through seven

(tiers one through four) only. Completion Rates and Student Organizations (tier five) were not perceived by the panelists as very important as quality indicators. Thus development of benchmarks for these items could be less productive.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

Quality standards and best practices have existed in business and industry since the early twentieth century (Kujala & Lillrank , 2004; Skyrme, 2002). Following World War II, many businesses and organizations looked for ways to improve performance in order to capture a larger piece of the global market. Initially, concepts such as Statistical Quality Control (SQC) and Total Quality Management (TQM) were introduced as a way to improve performance thereby improving quality. These concepts were soon followed by others including Six Sigma™, the Baldrige National Quality Program, and ISO 9000 quality standards. However, the common element among these quality improvement efforts was the promulgation of best practices that would lead to improved organizational processes and performance.

Quality improvement initiatives in American higher education originated in the late nineteenth century when the first private accrediting bodies were established as a way to ensure the quality of some U.S. academic institutions and programs. Various programs in higher education sought to establish accountability measures and attain credibility with the public by establishing minimum standards of quality. In 1988, the field of aviation higher education

created the Council on Aviation Accreditation (CAA), which adopted the goal of establishing uniform minimum educational quality standards. However, the CAA identified only practices and activities that should be components of quality collegiate aviation programs; the CAA did not establish any quality indicators for these programs. More recently, other fields in higher education have begun using quality indicators to benchmark best practices in collegiate programs such as nursing education, special education, business administration, law schools, and others. However, within the field of professional pilot training, no quality indicators have been identified for collegiate professional pilot training programs, and therefore, no benchmarks currently exist for determining program quality. As a result, this study proposed to answer the question: "What are the perceived quality indicators that identify an exceptional professional pilot program in higher education?", in the following areas:

1. Facilities
2. Equipment and technology
3. Faculty
4. Flight/Administrative/Staff Support
5. Government (FAA) compliance
6. Student organizations
7. Completion rates
8. Assessment/Evaluation
9. Curriculum and instructional delivery

Summary of Purpose and Research Methodology

The purpose of this research study was to identify quality indicators for collegiate professional pilot training programs at four-year institutions. The results of this study might help identify benchmarks to assist in the development of standards for collegiate professional pilot training programs, and might be useful in developing criteria for rating professional pilot programs. Prospective aviation students might find value in the quality indicators as bases for comparison of various aviation programs at four-year institutions of higher education. In addition, administrators and faculty members might find these indicators useful when recruiting aviation students and when establishing partnerships with the aviation industry.

For this study, the research technique used was the Delphi method. This technique involved using a non-random sample of participants who voluntarily agreed to participate. Participants were identified based on expertise rather than representativeness. In this research, a panel of 13 aviation experts volunteered to participate based on their expertise in the area of collegiate professional pilot training programs at four-year institutions. Although the experts represented 11different states, or 23% of the states within the continental United States, the researcher would have preferred a broader representation among the states. With this in mind, the researcher recommends caution regarding generalizing the findings of the study beyond the original sample.

In the first round of input, the panel of experts was asked to list their perceived quality indicators for collegiate professional pilot training programs. In

subsequent rounds, the panelists were asked to rate and rank the categories and the items within the categories based on importance. All 13 panelists completed the three rounds of input.

In round one, the panelists submitted statements regarding quality indicators pertinent to each of the ten categories. Through constant comparison analysis, the researcher combined and/or reduced the statements into like statement or items, leaving unique statements in tact. This was accomplished for each of the nine categories. Category 10, for Miscellaneous input, was provided as an area where panelists could include statements that they believed might not fit in the prescribed categories. After qualitative analysis of the items in Category 10, the researcher determined that all 16 statements could be included in six of the nine prescribed categories, thereby reducing the total number of categories to nine. In round two, the panelists were asked to rate and rank order all nine categories and the statements within the categories for importance. The researcher identified only eight emerging themes in categories 5 and 6; therefore, all eight statements were returned to each panelist in round three for final rating and ranking of categories and statements within the categories for importance. For Categories 1, 2, 3, 4, 7, 8, and 9, the top ten statements were returned to each panelist in round 3 for final rating and ranking of categories and statements within each category for importance.

Summary of Findings

The basic findings of this research indicated that panelists have clear agreement concerning their perceptions of quality indicators for professional pilot training programs. Panelists provided their perceptions of quality indicators as best practices within each of the nine prescribed categories; however, they primarily limited their comments to short, mostly non-descriptive statements without providing benchmarks or any quantifiable measures for the best practices they listed. Further, the panelists' mean ratings for importance for the categories ranked one through seven were higher than the mean ratings for importance for categories rated eight and nine, indicating that panelists attributed more relative importance (important to very important) to the top-rated categories and less importance (somewhat important to moderately important) to the lower-rated categories (Table 12).

Table 12

Categories by Tier Level in Order of Importance (N=13)

Category	Mean Rating for Importance	Tier Level	Final Rank
Faculty	5.00	1	1
Equipment &Technology	4.54	2	2
Curriculum & Instructional Delivery	4.69	2	3
Government (FAA) Compliance	4.46	3	4
Facilities	4.00	4	5

Table 12 (continued)

Categories by Tier Level in Order of Importance (N=13)

Category	Mean Rating for Importance	Tier Level	Final Rank
Assessment/Evaluation	4.00	4	6
Flight/Administrative/Staff Support Services	3.80	4	7
Completion Rates	3.31	5	8
Student Organizations	2.46	5	9

General Conclusions

The researcher offers the following general conclusions:

1. Based on analyses of panelists' overall comments, ΣRank scores, mean ratings for importance, and tier analysis, the quality factors identified by the panelists clearly fell into five groups or tiers.
2. The panelists rated and ranked the issue of faculty pay as the most important quality indicator for collegiate flight training programs. This issue was clearly more important than issues concerning quality factors for equipment and technology, curriculum delivery, regulatory compliance, facilities, and assessment/evaluation of programs.
3. The panelists' final rank order and ΣRank scores of the nine categories indicate clear agreement.
4. Panelists were in clear agreement in each category on the most important items within the category.

5. Panelists identified quality indicators that represent best practices but are not benchmarks for measuring program quality.

Summary of Categorized Conclusions

The conclusions are summarized by category, in the final order in which the categories were rated and ranked in round three, by the members of the Delphi panel of experts.

Category 1 – Faculty

The researcher eliminated some items in the Faculty category for consideration as potential indicators of quality, if the percentage of panelists rating the item as important to very important was less than fifty percent (50%). Based on this criterion, two of the ten items were eliminated and eight items were retained. Among these eight items, the researcher identified four issues and provided conclusions for each issue.

Issue 1 – Panelists were in overall agreement concerning the importance of the items in the Faculty category. Of particular importance to the panelists was the item involving pay, specifically: (1) pay that is adequate to attract high quality faculty, and (2) pay that is commensurate with other positions at the institution. One hundred percent (100%) of the panelists considered this item important to very important. Panelists were asked to rate all items on a five-point Likert-type scale with the number that best corresponded with their determination of importance. On a five-point Likert-type scale, a rating of important to very important was 4.00 – 5.00.

Conclusion – ***Quality collegiate flight training programs provide a level of pay that attracts high quality faculty and is at least equal to the pay of similar positions at the institution.*** Pay levels appear to be a sensitive issue in some programs and probably warrant further discussion. Although no additional qualitative comments were provided by the panelists, the high ratings might indicate that higher salaries attract higher quality faculty. There was nothing in the literature that discussed aviation faculty pay as a measure of academic strength or quality for professional pilot flight training programs.

Issue 2 – Two related items in the Faculty category were concerned with flight training programs having enough experienced flight instructors to accommodate the numbers of students. Flight training programs often use less experienced or junior, low-time flight instructors who are primarily graduates and graduate students. In many flight training programs, less experienced instructors are used to supplement full-time flight instructor teaching loads. Seventy-seven percent (77%) to eighty-five percent (85%) of the panelists rated this issue as important to very important based on their concern that the less experienced flight instructors needed mentoring and closer supervision by more experienced faculty.

Conclusion – ***A quality collegiate flight training program will consist of mostly flight instructors who have acquired a predetermined number of flight hours.*** Quality flight programs do not rely on low-time flight instructors to substitute for more experienced flight instructors and to increase flight hours available to students. Training programs that do rely on low-time flight instructors

need to re-evaluate this practice and determine if the flight instruction being provided is sufficient and constitutes quality time as perceived by the student. Excessive use of low-time flight instructors might be perceived as a negative factor by prospective student pilots who are looking at quality indicators for a specific professional pilot training program. Students who are trying to select a flight training program may base a portion of their decision on the number of available contact hours with more experienced flight instructors.

Issue 3 - Four of the items in the Faculty category concerned the "mix" of faculty in terms of both educational level and type of experience. Sixty-nine percent (69%) to seventy-seven percent (77%) of the panelists rated this issue important to very important.

Conclusion – ***A quality collegiate flight training program has a faculty with a variety of backgrounds including private industry, the military, and the airlines, and preferably at least a master's degree.*** Although all panelists considered educational level an important issue and potential quality indicator, there was a difference of opinion whether faulty should hold the minimum of a master or a doctoral degree; more panelists favored at least a master's degree. More experienced faculty tends to bring more real-world knowledge and skills to the training program. The researcher found nothing in the available literature that provided any guidance concerning the optimal composition of faculty in flight training programs. Although no demographic data were collected from the panelists during this research, the personal observation of the researcher, based on general conversations with a few panelists and their proffered titles, is that

many of their programs currently include faculty with a variety of educational and experience levels.

Issue 4 – Another indicator of program quality concerned the long-term commitment of faculty to stay with the training program, to maintain a high level of motivation, and to ensure student success. Seventy-seven percent (77%) of the panelists rated this issue as important to very important.

Conclusion – ***As an indicator of flight program quality, faculty commitment contributes to the success of a flight training program.*** This may also be an issue related to the use of low-time flight instructors who were viewed by the panelists as not being committed to the long-term growth and survival of the program. Many of the low-time flight instructors are former graduates or current graduate students (working as contract employees), providing flight training to other students as a means of accruing flight hours that will qualify them for pilot positions with the airlines. Using low-time flight instructors may result in a lack of long-term commitment to collegiate flight programs.

Category 2 – Equipment and Technology

The researcher did not eliminate any items in the Equipment and Faculty category from consideration as potential indicators of quality. Over fifty percent (50%) of the panelists rated all items in this category as important to very important. Based on this criterion, all ten items were retained. Among these ten items, the researcher identified six issues and provided conclusions for each issue.

Issue 1 – In four of the items in the Equipment and Technology category, panelists were concerned about the need for flight training programs to be equipped with flight simulators and/or aircraft types that include different levels of on-board electronics, specifically enabling student pilots to navigate using instruments and global positioning systems (GPS). Sixty-two percent to eighty-five percent (85%) of the panelists rated this issue as important to very important.

Conclusion – ***Quality collegiate flight training programs utilize technologically advanced aircraft (TAA) and/or flight simulators to provide flight training.*** Students who receive training in more technologically advanced aircraft are better prepared and are considered more highly qualified to fly the different types of aircraft currently used by most airlines. As an indicator of quality, this concern goes to the very heart of most programs and their ability to provide training in aircraft equipped with the latest technology. This makes graduates of collegiate programs who train in multi-engine aircraft as well as single-engine aircraft, and/or that are trained using flight simulators, in greater demand for pilot positions. Through participation on the Aviation Advisory Council at Oklahoma State University, the researcher has heard numerous representatives from the aviation industry voice their concern that collegiate flight training programs need to be more attuned to the technical training requirements of the aviation industry. Flight training programs need to be more adaptable and flexible when responding to rapidly changing training requirements affected by advances in flight technology.

Issue 2 – As an indicator of program quality, seventy-seven percent (77%) of the panelists rated as important to very important that collegiate flight training programs have well-maintained, clean equipment that reflects a professional operation, i.e., compliance with FAA regulations.

Conclusion – ***A quality collegiate flight training program will maintain all equipment to FAA standards.*** This item was highly rated by the panelists as an indicator of program quality. A number of collegiate flight programs are pressured by budget constraints to forego the maintenance of some equipment in order to maintain other equipment. The implication of this conclusion is that in order to be considered a "professional" flight operation, all equipment must be clean and well-maintained.

Issue 3 – Another indicator of program quality in the Equipment and Technology category concerned the need for access to updated aviation publications and FAA information databases. Pilots receive valuable flight information about changes to routes, regulatory compliance requirements, navigation aids, weather information, and other data that are necessary to ensure the safety of both the pilot and the general public. Seventy-seven percent (77%) to eighty-five percent (85%) of the panelists rated access to this information as important to very important.

Conclusion – ***Quality collegiate flight programs provide students with ready access to current aviation publications and FAA information databases.*** Although the panelists did not elaborate about this issue, the researcher concluded from the panelists' comments that some flight training

programs lack access to these materials, which can reflect on the ability of a program to ensure that students have all the resources they need to function safely in an aviation training environment. Further, this issue may be compounded by the level of computer technology available to students that enhances their access to resources through different educational media as indicated in Issue 4.

Issue 4 – Another item in the Equipment and Technology category that panelists perceive as an indicator of a quality flight training program is the necessity for classrooms to have state-of-the-art technology. Sixty-two percent (62%) of the panelists rated this issue as important to very important.

Conclusion – ***Quality collegiate flight training programs have classrooms equipped with computers, and other technologies such as on-line course portals, DVD, audio/visual and multi-media capabilities, wired and wireless Internet, and fiber-optic networks.*** Based on numerous comments, state-of-the-art classrooms are not only considered a vital necessity for teaching but an integral part of computer-based learning. In addition, students who have access to many types of technology are able to develop some of the technology skills they will be using in their careers. The types of available technology can also affect student access to aviation publications as noted in Issue 3.

Issue 5 – Another indicator of a quality flight training program was the need for a system to budget for technology upgrades. Sixty-nine percent (69%)

of the panelists rated this issue as important to very important; however, panelists did not propose any specific approach or model for a budget system.

Conclusion – ***A quality collegiate flight training program will have a budget that provides for upgrading technology.*** This technology upgrade encompasses not only classroom technology, but also upgrades in flight technology. Quality collegiate flight training programs are sensitive to the training needs of the aviation industry and are dependent upon timely replacement of outdated equipment and technology to maintain currency in the aviation career field.

Issue 6 – Panelists perceived the need for a quality flight training program to interface with industry to facilitate the acquisition of equipment and technology. Fifty-four percent (54%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate flight training program will partner with industry to acquire equipment and technology.*** Partnerships between collegiate flight training programs and the aviation industry are essential if quality training programs are to grow and thrive. As education budgets become tighter and financial resources diminish, flight programs find it necessary to seek industry partners. Through the researcher's involvement on the Aviation Advisory Council at Oklahoma State University, she is aware this issue has been discussed at almost every meeting over the past few years. These discussions have resulted in active partnerships with private industry to fund and/or donate various pieces of equipment, including a flight simulator, to OSU's flight training

program. Partnerships with industry are necessary if some collegiate flight training programs are to remain viable.

Category 3 – Curriculum and Instructional Delivery

The researcher did not eliminate any items in the Curriculum and Instructional Delivery category from consideration as potential indicators of quality. Over fifty percent (50%) of the panelists rated all ten items in this category as important to very important. Among these ten items, the researcher identified seven issues and provided conclusions for each issue.

Issue 1 – Panelists perceived the need for instructional delivery to challenge students to apply what they learn to real-world scenarios. This approach goes beyond the rote learning of facts. Nine-two percent (92%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate fight training program will involve the use of real-world scenarios or activity-based learning to train flight students, and will not rely on rote learning as an effective way to increase student comprehension.*** More than one instructional delivery method should be used to ensure that students develop higher level learning skills. Flight students need to be in situations where they apply what they have learned rather than simply performing flight procedures. This also includes training in how to transfer skills learned while using training devices (such as flight simulators) to actual flight situations. A variety of instructional delivery methods and what-if scenarios will better prepare students for successfully completing an initial airline checkout or an aircraft type rating.

Issue 2 – As an indicator of program quality, ninety-two percent (92%) of the panelists rated as important to very important that flight training curriculum be designed to meet the institution's mission and objectives.

Conclusion – ***Quality collegiate flight training programs design curriculum based on the institution's specific mission and objectives.*** The curriculum is structured to meet the specified outcomes of the flight training program. In addition, a quality flight training program can demonstrate that it is achieving the institution's stated objectives.

Issue 3 – Another indicator of a quality flight training program was that the professional pilot curriculum should teach more than the minimum requirements for FAA certification. Eighty-five percent (85%) to one-hundred percent (100%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot training curriculum will include the knowledge and practical skills required for FAA certification, as well as provide training in life-coping skills.*** Professional pilot training is inherently technical and requires great skill on the part of the pilot. However, good piloting depends on successful relationships among the pilot, other flight crew members, and the ground crew. This study revealed that flight training programs should include training that encompasses life-coping skills that help flight students deal with personal issues of identity, self-confidence, future goals, responsibility, and values. Life-coping skills overlap with the technical skills to play an important part in promoting air safety by minimizing human error. These skills could be taught as a part of Crew Resource Management (CRM),

although CRM typically focuses on making optimum use of resources but provides little or no focus on skills associated with personal well-being.

Issue 4 – Panelists perceived that curriculum should be reviewed periodically by faculty for improvements to ensure that industry's changing needs are being met. Sixty-two percent (62%) to nine-two percent (92%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate flight training program will ensure that faculty periodically reviews the curriculum to incorporate the changing needs of industry.*** This activity will involve the participation of aviation industry officials, generally in the form of an Aviation Advisory Council or committee. The committee will not determine the curriculum but will help guide the content based on industry needs. The training requirements of industry frequently go beyond a commercially designed generic curriculum and the minimum requirements for FAA certification.

Issue 5 – Panelists perceived the need for the curriculum of a quality program to include oral and written communications, math, science, computer science, as well as the required aviation core courses. Eight-five percent (85%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality professional pilot training program will require more than the aviation core courses, and will include training in oral and written communications skills, math, science, and computer technology.*** While many of the collegiate degree programs and curricula reviewed by the researcher for this study included some math, science, and computer courses,

the panelists expressed a specific need for additional coursework in these areas to supplement the core courses. In addition, the aviation industry was no different than other areas of professional employment in that more emphasis is being placed on a person's soft skills, particularly communications skills. The soft skills were viewed as complementing the technical skills.

Issue 6 – As an indicator of quality for a professional pilot training program, panelists felt that the aviation program and the institution should be accredited. Sixty-nine percent (68%) of the panelists rated the importance of this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot training program will be accredited by the Aviation Accreditation Board International (AABI), formerly the Council on Aviation Accreditation (CAA), and the university or college will be accredited by its regional accrediting body.*** Accreditation by the AABI is external validation that locally developed and maintained curricula are being held to minimum educational quality standards. The AABI standards are designed to ensure consistency in core curricula and are not intended to provide measures of quality for aviation training programs.

Issue 7 – Another indicator of a quality flight training program was that the professional pilot curriculum should be delivered using a variety of instructional modes. Sixty-two percent (62%) of the panelists rated this issue at important to very important.

Conclusion – ***A quality collegiate professional pilot training curriculum will use a variety of instructional delivery modes, including***

technology and traditional methods to reinforce essential information. The use of more than one type of instructional delivery mode optimizes student learning. In addition, educators should not confuse instructional delivery with instructional technology, as instructional delivery can be effective without the use of instructional technology.

Category Ranked 4 – Government/FAA Compliance

The researcher eliminated items in the Government/FAA Compliance category for consideration as potential indicators of quality if the percentage of panelists rating the item as important to very important was less than fifty percent (50%). Based on this criterion, two of the eight items were eliminated and six items were retained. Among these six items, the researcher identified four issues and provided conclusions for each issue.

Issue 1 – All 13 of the panelists perceived FAA/government compliance as a definite indicator of program quality. Ninety-two percent (92%) of the panelists rated this item as important to very important.

Conclusion – ***A quality collegiate professional pilot training program will include mandatory and full compliance with FAA/government regulations.*** Although compliance with FAA regulations meets minimum requirements, quality training programs seek to go beyond the minimum requirements and implement higher standards. This compliance applies to the regulations pertaining to flight operations and the regulations pertaining to maintenance of facilities and equipment. Although there was overall agreement about the necessity for FAA/government compliance, there was some

disagreement regarding the regulations under which a quality program should be operated, i.e., FAR Part 61 vs. FAR Part 141/142. However, some form of FAA/government compliance was viewed as critical to safety.

Issue 2 – One indicator of a quality flight training program concerned two issues relating to safety: (1) the need for a safety officer, and a reporting and feedback system, and (2) the need for regular visits from the local FAA Principal Operations Inspector (POI) for onsite consultations and safety training. Seventy-seven percent (77%) to ninety-two percent (92%) of the panelists rated these issues as important to very important.

Conclusion – ***A quality collegiate professional pilot training program will include an in-house safety officer, an effective system for monitoring and reporting safety issues, and ongoing interaction with the local FAA POI.*** Safety permeates every aspect of flight training and a quality program will ensure the safety of students, flight training personnel, and maintenance personnel. Under current FAR Part 141 regulations, pilot training schools are not required to have a designated safety officer/manager position for program certification. However, an important component of an effective safety system includes the interaction of program personnel with the FAA POI. One of the many job responsibilities of the assigned FAA POI involves conducting a facility inspection of a Part 141 pilot school to ensure continued compliance with regulations. The importance of the relationship between the school and the FAA POI is crucial to the safe operation of the flight training program.

Issue 3 – Another quality indicator for a pilot training program was the need for a self-auditing mechanism that keeps all records in compliance with FAA regulations. Eighty-five percent (85%) of the panelists rated this item as important to very important.

Conclusion – ***A quality collegiate professional flight training program incorporates an onsite self-auditing method for ensuring that flight school records are in compliance with FAA regulations.*** While there was a high level of agreement that this issue is an indicator of program quality, panelists did not offer any additional comments or recommendations concerning a proposed auditing method or system.

Issue 4 – Panelists perceived the need for a quality program to provide flight instructor refresher training. Sixty-two percent (62%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot training program includes flight instructor refresher training programs in addition to mandatory FAA refresher training requirements.*** Although panelists did not provide addition comments, this issue indicates a desire to go beyond the minimum required under FAR Part 141 certification. In addition, if a flight training program hires low-time, less-experienced flight instructors, refresher training could be viewed as a way to offset lack of experience with additional training.

Category Ranked 5 – Facilities

The researcher eliminated items in the Facilities category for consideration as potential indicators of quality if the percentage of panelists rating the item as

important to very important was less than fifty percent (50%). Based on this criterion, one of the ten items was eliminated and nine items were retained. Among these nine items, the researcher identified six issues and provided conclusions for each issue.

Issue 1 – One quality indicator for a flight training program concerned four issues relating to adequate space: (1) the need for space for individual briefings and debriefings, and (2) the need for flight planning space with charts, approach plates, flight plans, and weather information, (3) the need for classroom space for ground school, and (4) the need for space for hangar maintenance and storage. Sixty-two percent (62%) to ninety-two percent (92%) of the panelists rated these issues as important to very important.

Conclusion – ***A quality collegiate professional pilot training program includes adequate space for briefings, debriefings, flight planning, ground school, maintenance, and storage.*** Although panelists were in much agreement about the importance of the issue concerning space, no additional comments were provided elaborating on what kind of space or how much would be considered “adequate” or “appropriate”, i.e., no square footage or ratio criteria. For example, FAR Part 141 regulations only require pilot briefing areas be “adequate to shelter students waiting to engage in their training flights.” FAR Part 141 also states that ground training facilities be heated, lighted, and ventilated to conform to local building, sanitation, and health codes, and located so that students are not distracted by other flight and maintenance operations.

FAA regulations do not specifically address maintenance and storage space other than to state that facilities should meet training curricula requirements.

Issue 2 – Another quality indicator for a professional flight training program was that the facility should have instrument approaches at or near the home airport that include VOR, NDB, ILS, and GPS. Eighty-five percent (85%) of panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot training program has instrument approach capability at, or a short flight from, the home airport and includes VOR, NDB, ILS, and GPS.*** VOR (VHF Omni-directional radio range) and NDB (non-directional beacon) are types of radio navigations systems for guiding aircraft; the NDB technology being slightly more sophisticated than the VOR. NDBs are more commonly used with ILS (instrument landing systems) to mark landing approaches or paths that enable the pilot to safely navigate the aircraft. GPS (global positioning system) technology is a space-based navigational system that will likely replace aircraft radio navigation aids such as the NDB and VOR. A quality flight training program will ensure that its curricula provides students with opportunities to gain experience with all types of navigational aids depending on the level of training being sought by the student. This type of experience is particularly essential for students in a professional pilot training program who plan on seeking a flight career in aviation.

Issue 3 – Another quality indicator for collegiate flight training programs included the requirement that facilities be personal yet represent a professional,

well-maintained flight operation. Sixty-nine percent (69%) of the panelists rated this item as important to very important.

Conclusion –***A quality collegiate professional pilot training program will have a personalized appearance yet reflect a professional flight operation.*** Although numerous comments were provided concerning this issue, no specific recommendations were provided to help determine an appropriate mix of personal and professional. While maintaining a professional environment is essential to a quality program, the enormity of the college environment can overwhelm some students. A flight operation that does not appear inviting, nor is well maintained and professional in appearance, can leave a negative impression of the program and possibly send the wrong message to perspective students.

Issue 4 – Panelists perceived that a quality flight training program will provide hangar and maintenance facilities so that ongoing maintenance keeps the aircraft operational and continually available to students. Seventy-seven percent (77%) the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will maintain its aircraft to maximize availability to student pilots.*** Obstacles such as inclement weather frequently hinder flight operations. If aircraft are not available due to required maintenance, then non-availability of aircraft becomes an obstacle to available flying time. Students are not able to take full advantage of opportunities to accumulate the needed flight hours to successfully complete training requirements. This concern also highlights the

importance of budgeting for aircraft maintenance to ensure the availability of aircraft when needed.

Issue 5 – Another quality indicator for collegiate flight training programs included the requirement that facilities have convenient access to a library containing information on a variety of aviation subjects. Fifty-four percent (54%) of the panelists rates this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will include a reference library on aviation-related topics, conveniently located for flight students.*** This reference library will have materials in a variety of media and be available to students for studying and research projects. Collegiate flight training facilities are often located on an airport or flight center away from the main campus, making it more difficult for flight students to access the campus's primary library facility. While many of the core aviation courses may be on the main campus, student pilots spend a great deal of time accruing the required flight training hours. In this instance, a convenient reference library would be one that is co-located with the flight training facility. This issue differed from Important Issue (3) in the Equipment and Technology category, where the concern was access to aviation publications and FAA information databases that impact operational, safety-related issues such as the location of navigation aids.

Issue 6 – Panelists perceived that a quality flight training program will provide alternate runways for safely practicing a variety of flight maneuvers.

Sixty-two percent (62%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will have a facility that provides an alternate field or runway where students can practice different approaches, takeoffs and landings, and stall training.*** Since flight training is a combination of knowledge and practical application, students need opportunities to simulate life-like situations. This issue is compatible with Issue 1 in the Curriculum and Instructional Delivery category that stated the need for flight students to experience opportunities for scenario-based and activity-based learning as a way to enhance flight skills.

Category Ranked 6 – Assessment /Evaluation

The researcher eliminated items in the Assessment/Evaluation category for consideration as potential indicators of quality if the percentage of panelists rating the item as important to very important was less than fifty percent (50%). Based on this criterion, two of the ten items were eliminated and eight items were retained. Among these eight items, the researcher identified five issues and provided conclusions for each issue.

Issue 1 – Panelists perceived that a quality flight training program will utilize assessments to address higher order learning skills rather than assessment of rote learning. Eighty-five percent (85%) the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will have a formal assessment/evaluation system that assesses***

higher order thinking and learning skills as well as factual knowledge. Although flight training has the appearance of being predominantly a practical application, flight students must be able to take the factual knowledge they have acquired (often memorized) and utilize these facts for critical thinking, analysis, and problem-solving. Aviation educators are no different than other educators in higher education in that they realize the value of being able to apply learning to the workplace, or in this case, to the safe operation of aircraft.

Issue 2 – One quality indicator for a flight training program concerned four items relating to assessment/evaluation: (1) the need for assessment/evaluation to result in continuous program improvement, (2) the need for external review by aviation educators or peers, (3) the need for accreditation by CAA/AABI in that periodic peer evaluation is an element of the accreditation and re-accreditation process, and (4) the need to use specified outcomes along with assessment/evaluation. Sixty-two percent (62%) to eight-five percent (85%) of the panelists rated these issues as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will include a formal assessment/evaluation system conducted by third party reviewers, be based on specific program outcomes, and result in continuous quality improvement to the overall program.*** Some aviation educators view program evaluation as an existing element of FAA oversight. While the FAA regulations provide for periodic reviews of faculty qualifications, facilities, equipment, curricula, student records, and other areas, a formal system of assessment/evaluation could be the mechanism for implementing program

improvement initiatives in all areas of flight training. This issue concerning program assessment/evaluation should not be confused with the evaluation of individual student skills required for obtaining an FAA certificate. Some aviation educators equate a student's success in passing a test and obtaining an FAA pilot certificate with program success.

Issue 3 – Another quality indicator for collegiate flight training programs included the requirement that assessment/evaluation of flight training be conducted at the time student progress or stage checks and end-of-course checks are conducted. Seventy-seven percent (77%) of the panelists rates this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program should conduct a formal assessment/evaluation of flight training at predetermined points in the syllabus.*** FAA regulations require that each student accomplish stage checks and end-of-course tests in accordance with the program's curricula. During these stage checks and end-of-course checks, formative evaluation could be conducted by collecting continuous feedback from students in the flight program, and using the results of the evaluation to revise the flight program where needed.

Issue 4 – Panelists perceived that a quality flight training program will have a method for tracking training weakness for remediation. Fifty-four percent (54%) the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will have a formal process to track student training weaknesses***

for remediation purposes and for making subsequent improvements to the program. The primary focus of remediation is to improve student performance, particularly when a student has failed to pass a required stage check or end-of-course test based on the requirements of the program's course. However, a tracking process to identify student weaknesses could be used in combination with or alongside program evaluation to support overall program improvement efforts.

Issue 5 – Another quality indicator for collegiate flight training programs involved programs providing names of employers who have had successful experiences with the program's graduates to potential students. Fifty-four percent (54%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will provide prospective students with references from satisfied employers who have hired the program's graduates.*** This effort will require some formal method of tracking students after graduation, and conducting a survey of their employers. While this approach might provide information to prospective students and their parents, the matter of employee rights to privacy, along with other sensitive subjects, may preclude gathering and disseminating this type of information to the public.

Category Ranked 7 – Flight/Administrative/Staff Support

The researcher eliminated items in the Flight/Administrative/Staff Support category for consideration as potential indicators of quality if the percentage of panelists rating the item as important to very important was less than fifty percent

(50%). Based on this criterion, one of the ten items was eliminated and nine items were retained. Among these nine items, the researcher identified five issues and provided conclusions for each issue.

Issue 1 – One quality indicator for a flight training program concerned two related items: (1) the need for adequate support staff to oversee flight operations and assure compliance with FAA regulations, and (2) the need for adequate administrative support staff to service all students and staff. Seventy-seven percent (77%) to eighty-five percent (85%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will have administrative support staff to provide operational oversight and to assure regulatory compliance.*** Operational oversight and regulatory compliance encompass a broad range of areas such as flight operations, maintenance operations, recordkeeping, adherence to the syllabus, and others. Personnel should support all areas.

Issue 2 – Another quality indictor for a collegiate flight training program was administrative/staff support for a safety program and a safety committee with safety-related responsibilities. Ninety-two percent (92%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will have a formal safety program with a safety committee responsible for investigating incidents and reporting hazards.*** While the need for a safety officer was an issue raised in the Government/FAA Compliance

category (ranked 4), this issued is concerned with the need for administrative/support personnel to function as a safety committee with investigative responsibilities into minor safety-related problems, i.e., incidents and hazards. A committee with these types of responsibilities might be instrumental in preventing major safety-related problems in the future.

Issue 3 – One quality indicator for a flight training program concerned two related issues: (1) the need for administrative/staff personnel who understand the peculiarities of aviation training programs, and (2) the need for administrative/staff personnel who understand and support maintenance costs. Fifty-four percent (54%) to eighty-five percent (85%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will have administrative/staff personnel who are knowledgeable about the uniqueness of a flight training program and who support the costs associate with aircraft maintenance.*** This issue highlights the necessity for keeping all persons associated with the flight training program well-informed about regulatory requirements and any day-to-day issues, particularly the impact of budget shortfalls affecting aircraft maintenance. Some department heads, school deans, or others overseeing collegiate flight training programs do not have an aviation background and need to be kept abreast of flight program peculiarities.

Issue 4 – Another quality indictor for a collegiate flight training program was the need for aviation students to have access to all university support

services as well as the support of a mentor in the aviation industry. Sixty-two percent (62%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will coordinate university or academic support services with support from the aviation industry.*** The involvement of the aviation industry in the education of flight students is essential. Many aviation companies and organizations provide students opportunities for internships, which can lead to permanent jobs. At the very least, a mentor in the aviation industry can complement the career guidance provided by the institution.

Issue 5 – One quality indicator for a flight training program concerned two issues regarding the overall composition of a flight training organization in terms of the specific positions that should be included. Fifty-four percent (54%) to seventy-seven percent (77%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will include administrative/staff personnel positions such as: administrative secretary, administrative assistant, dispatcher, flight scheduler, research assistant, building supervisor, fuel service technician, aircraft handler, safety manager, and others determined necessary for the operation of the training program.*** FAA regulations under FAR Part 141 require a flight training program to have specific personnel: certificated flight instructor(s), certificated ground instructor(s), and a chief flight instructor, for

each approved course of training; however, other administrative/support positions are not specifically required by regulation.

Category Ranked 8 – Completion Rates

The researcher eliminated items in the Completion Rates category for consideration as potential indicators of quality if the percentage of panelists rating the item as important to very important was less than fifty percent (50%). Based on this criterion, four of the ten items were eliminated and six items were retained. Among these six items, the researcher identified five issues and provided conclusions for each issue.

Issue 1 – Panelists perceived that a quality flight training program should monitor overall completions, but not use completion rates as the only measure of program integrity. Ninety-two percent (92%) the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will monitor the completion rate and use it as one of the measures of program quality.*** The costs associated with the operation and maintenance of flight training programs are high, and are a major reason students never complete the program, or do not complete the program in a timely manner. Although one measure of program quality could be program completion rates, nothing was found in the literature to indicate that completion rates have been used as a quality indicator for flight training programs.

Issue 2 – Another quality indicator for a flight training program was the suggestion that the scheduling of flight courses should be similar to other

university courses with multiple sections available to flight students and capped enrollments for each section. Sixty-nine percent (69%) to seventy-seven percent (77%) of the panelists rated this item as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will provide course offerings with multiple sections to increase availability of aircraft to students.*** By increasing the number of sections available to students and capping the enrollment in each section, more students will have the opportunity to complete flight training on a scheduled basis. Other factors can affect the flight schedule; weather and maintenance being two of the most important. However, if flight instructors and airplanes are readily available to the students, students have a better chance to complete the flight training.

Issue 3 – Another quality indicator of a flight training program included the notion that the degree is the ultimate goal of the program. Sixty-nine percent (69%) of the panelists rates this item as important to very important.

Conclusion – ***In a quality collegiate professional pilot flight training program, completion of a professional pilot training curricula will result in a bachelor's degree.*** Most collegiate flight training programs are structured to lead to a bachelor's degree consisting of 120 – 130 credit hours. Although the literature stated that few major airlines required a college degree for employment, more than 95 percent of the pilots hired over the past several years had completed a bachelor's degree (Spangler, n.d., ¶ 4). There was no reference in the literature regarding the number of students entering versus the number of students completing flight training at four-year institutions of higher learning.

Issue 4 – Panelists perceived that a quality flight training program that selected highly motivated students would have higher completion rates. Sixty-none percent (69%) of the panelists rated this item as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will have a procedure in place to screen prospective students for academic success.*** Program completion rates will be higher if students are made aware of program expectations before being allowed to enroll. Although the issue of requiring students to have a minimum ACT/SAT score was mentioned, there was limited agreement that using these scores to pre-screen students would have an impact on flight training completion rates. Again, there was nothing in the literature indicating pre-screening of any type increases the completion rates of flight training programs.

Issue 5 – Another quality indicator for collegiate flight training programs stated that completion rates could be enhanced by better utilization of bad weather days for ground school. Sixty-two percent (62%) of the panelists rated this item as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will utilize non-flying days to supplement mandatory ground school training.*** Basic ground school is sometimes viewed as insufficient. Other opportunities that make time available for more classroom training should be used to supplement basic ground training. These opportunities can arise suddenly, particularly when flight training is cancelled due to bad weather.

Category Ranked 9 – Student Organizations

The researcher eliminated items in the Student Organizations category for consideration as potential indicators of quality if the percentage of panelists rating the item as important to very important was less than fifty percent (50%). Based on this criterion, seven items were eliminated and one item was retained.

Issue 1 – A quality indicator for collegiate flight training programs included the need for students to be involved in a number of flight-related organizations. Fifty-four percent (54%) of the panelists rated this issue as important to very important.

Conclusion – ***A quality collegiate professional pilot flight training program will be actively involved in a variety of industry and collegiate aviation organizations, and will encourage student and faculty participation.*** Program and student involvement in industry and collegiate aviation organizations provide a valuable link to the aviation profession and contribute to the self-image of the student. Further, participation in these organizations allows students to network with industry, providing opportunities for internships, part-time jobs, and future employment. In conclusion, students involved in these organizations gain opportunities to practice leadership skills, to generate interest and enthusiasm for the field of aviation, particularly professional flight training.

Discussion

The significance of this study is derived from the comments provided by the Delphi panelists concerning their perceptions of quality indicators for

collegiate professional pilot training programs. In essence, panelists were in agreement about most of the quality indicators in all nine areas or categories.

The comments provided by the panelists for this study were primarily qualitative in nature. While the researcher had hoped to obtain quality indicators that were more specific in detail, the indicators that were identified can be used as best practices, and serve as a starting point from which to further identify benchmarks for determining program quality. Currently, aviation programs in higher education, and specifically pilot training programs, do not have benchmarks against which a flight training program can be measured. Much of private industry and government have embraced the concept of best practices and benchmarking as a way to measure program quality and to improve performance. Other programs in higher education have chosen to follow their lead, and the literature is filled with articles about quality indicators for nursing programs, special education, law, technical education, engineering, and others. Do aviation educators want to look at quality indicators and the pursue standards that go beyond the minimum standards required for CAA/AABI accreditation? Is aviation higher education ready to explore areas where quality indicators might be identified, such as in the categories used in this study? Are aviation educators willing to subject their programs to the intense scrutiny necessary to put aviation programs in line with other higher education programs? Are aviation programs prepared for the controversy that might arise if quality indicators become the basis for comparing ratings and rankings of aviation programs, and flight training programs specifically? And, are educators ready for how this might

impact the dynamics of the existing program? These are some of the questions that arise, and that require reflection and analysis on the part of any aviation educator concerned with the quality of collegiate professional pilot training programs.

The researcher's model, shown in Figure 4, depicts a framework based on this study for pursuing best practices and should serve as a reminder that program quality initiatives must emanate from all program areas, must result in specific benchmarks, and must be designed to include continuous program improvement.

Implications and Recommendations for Future Research

Aviation is a highly technical, rapidly changing field. However, aviation is no different that any other field that endeavors to improve and remain competitive. This study is simply the first attempt to identify quality indicators for collegiate professional pilot programs, and highlights the potential for future areas of research. Recommendations for future research are:

1. Is there currently enough agreement in specific areas or categories (such as the categories in this study) to warrant further research?
2. Should a survey be done to determine interest in identifying benchmarks for quality indicators, i.e., best practices of collegiate flight training programs?
3. Can the minimum standards currently used for CAA/AABI accreditation be enhanced to include specific benchmarks for quality indicators?
4. Should the views of graduates, i.e., professional pilots in various stages of their careers, be surveyed regarding the issue of pay?
5. Should a follow-up survey with qualitative interviews be conducted to obtain in-depth clarifications, explanations, concerns, and other suggestions to advance this line of inquiry?

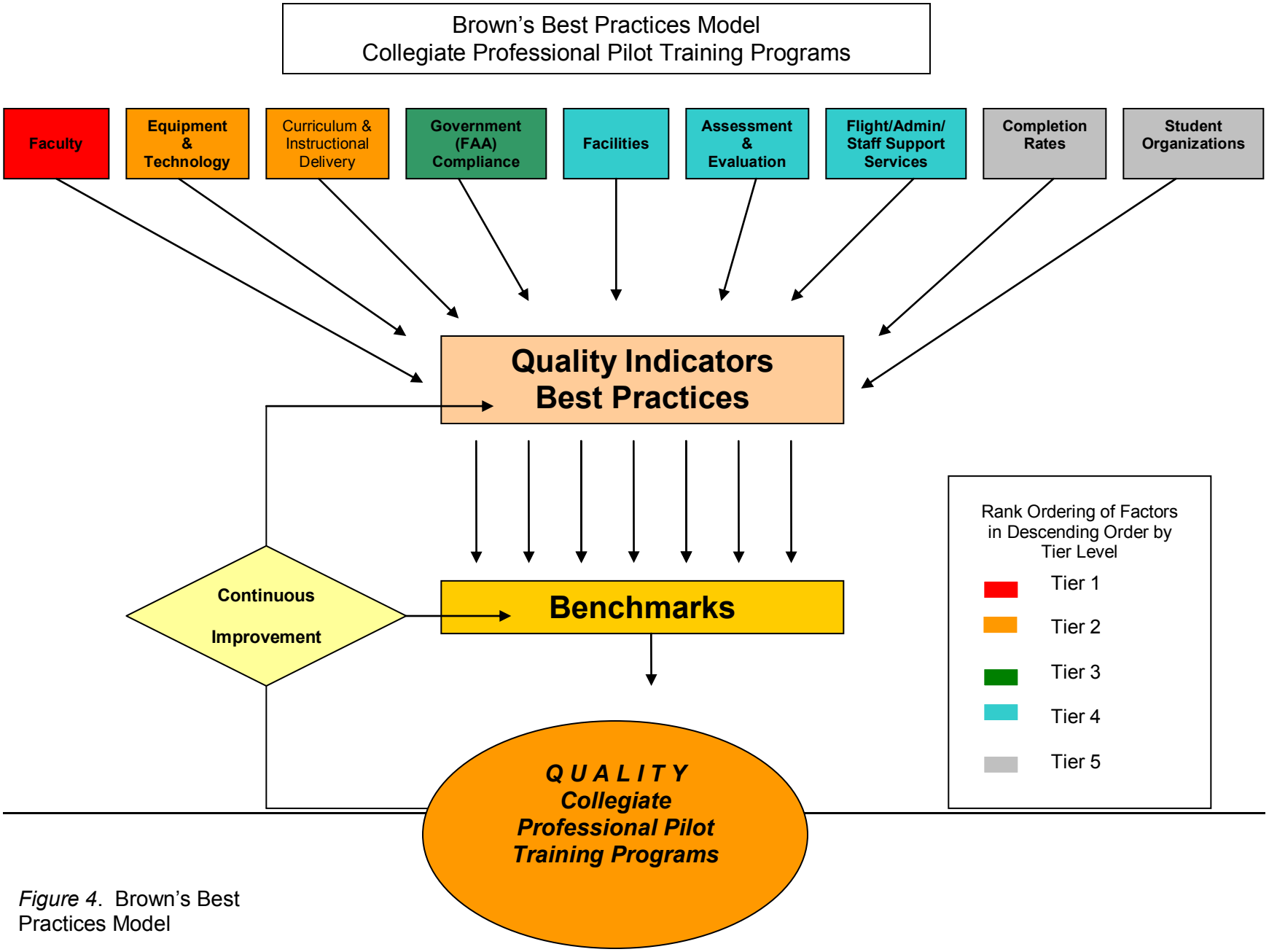


Figure 4. Brown's Best Practices Model

REFERENCES

Aerospace Industries Association (2004). Revitalization of the aerospace workforce. Retrieved September 5, 2004, from http://www.aia-aerospace.org/issues/subject/employment_facts.cfm

Agur, P.V. (2006). Business aviation best practices. Retrieved March 26, 2006, from http://www.vanallen.com/publications.htm.

Allen, T.H. (1978). New Methods in Social Science Research: Policy Sciences and Futures Research. New York: Praeger, 123-125.

American Society for Quality. (2004). Retrieved April 14, 2006, from http://www.asq.org/learn-about-quality/history-of-quality/overview/20th-century.html

Anderson, L.K. & Gurney, B.D. (1993). *Benchmarking best practices in the technology transfer* (Final Report). Colorado Springs, CO: Colorado Institute for Technology Transfer and Implementation. (ERIC Document Reproduction services No. ED385214)

AOPA Flight Training. (n.d.). Retrieved November 4, 2006, from http://flighttraining.aopa.org/apps/student/memberbenefits.cfm

Arenson, K.W. (1997, March 19). A study alters criteria in rating universities, and Stony Brook soars. *The New York Times,* p. B12.

Arnold, S.D., Kozel, C.T. & Velarde, L.D. (2004). Recommendations for evaluating accreditation guideline outcomes assessment methods for accredited environmental health programs in the United States. *Journal of Environmental Health, 67*(1), 22-26.

Astin, A.W. (1988). Achieving Educational Excellence. San Francisco: Jossey-Bass, Inc., Publishers.

Astin, A. (1993). What matters in college? San Francisco: Jossey-Bass Publishers.

Ausburn, L. (2002). Fast, flexible, and digital: Forecasts for Occupational and Workplace Education. *Workforce Education Forum, 29*(2), 29-49.

Ausburn, L. (2003). Beyond the inflection point: The softer side of learning's new digital landscape. *Scholar Practitioner Quarterly, 2*(1), 79-97.

Aviation Institute Self Study Report for the Council on Aviation Accreditation. (1997). *The UNO Aviation Monograph Series, UNOAI Report 97-1*.

Baldrige National Quality Program. (2006). *Criteria for performance excellence*, 77.

Billings, D.M., Connors, H. R., & Skiba, D.J. (2001). Benchmarking best practices in Web-based nursing courses. *Advances in Nursing Science, 23*(3), 41-52.

Blakeman, J. (2002). *Benchmarking: Definitions and overview.* Center for Urban Transportation Studies, University of Wisconsin-Milwaukee. Retrieved April 15, 2006, from http://www.edu/Dept/CUTS/bench/bm-desc.htm

Bliss, T., Green, M., & Larsen, A.R. (2005). *Collegiate aviation and September 11, 2001: A survey of current issues. Collegiate Aviation Review, 23*(1), 9-16.

Bollag, B. (2004). Opening the door on accreditation. *Chronicle of Higher Education, 50*(45), A22-A24.

Buyukozkan, G. & Maire, J. (1998). Benchmarking process formalization and a case study. *Benchmarking for Quality Management & Technology, 5*(2), 101.

Camp. R. C. (1995). *Business process benchmarking: Finding and implementing best practices.* ACQC Quality Press: Milwaukee, WI.

Carnegie Foundation for the Advancement of Teaching (1994). A classification of institutions of higher education.

Carter, T. (1998). Rankled by the rankings. *ABA Journal, 84,* 46-53.

CHEA Chronicle. (2006). *2006. CHEA award for institutional progress in student learning outcomes, 7*(2), 1-4.

Clarke, M. (2002). Quantifying quality: What can the U.S. News and World Report rankings tell us about the quality of higher education? *Educational Policy Analysis Archives, 10*(16). Retrieved April 11, 2006, from http://epaa.asu.edu/epaa/v10n16/

Codling, B.S. (1997). Dynamics of best practice: A multidimensional perspective. *Benchmarking for Quality Management & Technology,4*(2), 96-103.

College Aviation Accreditation Guidelines. (1976). University Aviation Association Workshop, 1-80.

Conrad, C.F. & Blackburn, R.T. (1985). Program quality in higher education: A review and critique of literature and research. In *Higher Education: Handbook of Theory and Research, 1* (pp. 283-308). New York: Agathon Press, 283-308.

Contreras, A. (2005). Giving credit where credit is due. *Chronicle of Higher Education, 52*(8), B-12.

Council for Higher Education Accreditation (n.d.). Informing the public about accreditation. Retrieved March 30, 2005, from http://www.chea.org/public_info/index.asp

Council for Higher Education Accreditation (2006a). *2006-2007 Directory of CHEA Recognized Organizations,* 1-16.

Council for Higher Education Accreditation (April 2006b). *Fact sheet #1, Profile of Accreditation.*

Council for Higher Education Accreditation. (2006c). *Recognition of accrediting organizations: Policy and procedures,* p.19.

Council for Higher Education Accreditation. (2006d). *Recognized accrediting organizations (as of February, 2006)*. Retrieved January 13, 2007, from http://www.chea.org/pdf/CHEA_USDE_AllAccred.pdf

Council on Aviation Accreditation, Inc. (1995). Accreditation standards manual. Auburn, AL.

Council on Aviation Accreditation, Inc. (2005). Accreditation standards manual, Form 101. Auburn, AL.

Craft, S.G. (n.d.). Embry-Riddle in a world at war, 1935-1945. Retrieved September 15, 2006, from http://www.erau.edu/er/abouterau/er-worldwar.pdf

Crave, E. (1980). Academic program evaluation. *New Directions for Institutional Research, No. 27.*

Creswell, J.W., Plano Clark, V.L., Gutmann, M.L., & Hanson, W.E. (2003). Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social & behavioral research* (p. 212). Thousand Oaks, CA: Sage Publications, Inc.

Crissey, M. (1997). Changes in annual college guides fail to quell criticisms on their validity. *The Chronicle of Higher Education.* Retrieved June 6, 2006, from http://chronicle.com/free/v44/i02/02a06701.htm

Czarnecki, M.T. (1996). Benchmarking: A data-oriented look at improving health care performance. *Journal of Nursing Care Quality, (10)*3, 1-6.

Daigle, S.L. & Cuocco, P. (2002). Public accountability and higher education: Soul mates or strange bedfellows? *Educause Center for Applied Research Bulletin, 2002*(9), 1-14.

Dale, S.B. & Krueger, A.B. (2002). Estimating the payoff to attending a more selective college: An application of selection on observables and unobservables. *The Quarterly Journal of Economics, (117)*(4), 1491-1527.

Davies, A.J. & Kochhar, A.K. (2002). Manufacturing best practice and performance studies: A critique. *International Journal of Operations & Production Management, 22*(3), 289-305.

Dean, S. (2000). The rankings game. *Continuum, 10*(3). Retrieved April 11, 2006, from http://www.alumni.utah.edu/continuum/winter00/rankings.htm

Department of State Regulation, Sec. 62.22(n)(1)(i), Trainees. Retrieved November 6, 2006, from http://www.interexchange.org/interexchange/regulations.html

Dodd, A.H. (2004). Accreditation as a catalyst for institutional effectiveness. *New Directions in Institutional Research, 123,* 13-25.

Elmuti, D. & Kathawala, Y. (1997). An overview of benchmarking process: A tool for continuous improvement and competitive advantage. *Benchmarking for Quality Management & Technlogy, (4)*4, 229-243.

Ehrenberg, R. G. (2001). Reaching for the brass ring: How the U.S. News & World Report rankings shape the competitive environment in U.S. higher education. Prepared for the Macalester College Forum on Higher Education, June 12, 2001. (ERIC Document Reproduction Service No. ED470061)

Farrell, E. (2003). A common yardstick? *Chronicle of Higher Education, 49*(49), A25.

Flight to Success. (n.d.). Retrieved January 13, 2007, from http://cms.kent.edu/tech/AcademicDivisions/Aeronautics/programinformation/index.cfm

Fry, J., Humphreys, I., & Francis, G. (2005). Benchmarking in civil aviation: Some empirical evidence. *Benchmarking: An International Journal (12)*2, 125-137.

Gay, L.R. (2000). *Educational research.* Columbus, OH: Merrill Publishing.

Gibbs, N. & Thornburgh, N. (2006). Who needs Harvard? *Time Magazine, August 21, 2006*, 37-45.

Graham, H. & Diamond, N. (1999). Academic departments and the ratings game. *Chronicle of Higher Education, 45*(41). Retrieved April 29, 2006, from the Academic Search Elite database.

Guba, E.G., & Lincoln, Y.S. (1985). *Effective evaluation.* San Francisco, CA: Jossey-Bass.

Guillemette, R. (n.d.). Civilian pilot training program. *U.S. Centennial of Flight Commission.* Retrieved September 8, 2006, from http://www.centennialofflight.gov/essay/GENERAL_AVIATION/civilian_pilot_training/GA20.htm

Harvey, L. (2004). The power of accreditation: Views of academics. *Journal of Higher Education Policy and Management, (26)*2, 207-223.

Hattendorf, L. C. (1996, July). *Educational rankings of higher education: Fact or fiction?* Paper presented at the 8th International Conference on Assessing Quality in Higher Education, Queensland, Australia.

Hiebler, R., Kelly, T. & Ketteman, C. (1998). *Best practices: Building your business with customer-focused solutions.* New York, NY: Simon & Schuster.

Higgins, I. (1997), Benchmarking in health care: A review of the literature. *Australian Health Care Review, (20)*4, 60-69.

Highett, N. (1994). Best practices for school and systemic development. ERIC ED 369160, 1-20.

Hodges, S. (2002). Authentic values and ersatz standards. *Academe, 88*(6), 33. Retrieved April 29, 2006 from the Academic Search Elite database.

Holub, T. (2002). College rankings. (ERIC Document Reproduction Service No. ED468728)

Hossler, D., Braxton, J., & Coopersmith G. (1989). Understanding student college choice, *Higher Education: Handbook of Theory and Research, 5.*

Imai, M. (1986). *Kaizen: The key to Japan's competitive success.* McGraw-Hill.

International Organization for Standardization. (2005). *Overview of the ISO system.* Retrieved April 3, 2006, from http://www.iso.org/iso/en/aboutiso/introduction/index.html?

Johnstone, R.W. (2006). *9/11 and the future of transportation security.* Westport, CT: Greenwood Publishing Group, Inc.

K-State Undergraduate Catalog. (2006). Retrieved January 13, 2007, from http://courses.k-state.edu/catalog/undergraduate/ta/aviation.html

Kersten, G. (2000). Grading on the curve: College ratings and rankings. Retrieved March 30, 2005, from http://www.sls.lib.il.us/reference/por/features/99/collrank.html

Kirk, S. & Corcoran, K. (1995). School rankings: Mindless narcissism or do they tell us something? *Journal of Social Work Education, 31*(3), 408-415.

Kiteley, G.W. (n.d.). Collegiate aviation programs and options. Aircraft Owners and Pilots Association. Retrieved March 2, 2005, from http://www.aopa.org/learntofly/startfly/collegiate.html?PF

Kiteley, G.W. (n.d.). Aviation programs in the USA: Collegiate aviation programs in the United States. Retrieved September 16, 2006, from http://www.sci-eng.net/articles/aviation_programs.htm

Kleinert, H.L., Smith, P.D., & Hudson, M. (1990). Quality program indicators manual for students with moderate and severe handicaps. ERIC ED 354 680, 1-98.

Kristoffersen, D., Sursock, A. & Westerheijden, D. (1998). *Manual of quality assurance: Procedures and practice.* Turin: European Training Foundation, 11.

Krueger, D.W. (1993). Total Quality Management. In T. Banta & Associates, *Making a difference: Outcomes of a decade of assessment in higher education* (pp. 269-282). Jossey-Bass: San Francisco.

Kujala, J. & Lillrank, P. 2004. Total quality management as a cultural phenomenon. *Quality Management Journal*, *11*(4), 43-55.

Lederman, D. (2006). A less rank alternative. Retrieved August 31, 2006, from http://www.insidehighered.com/layout/set/print/news/2006/02/21/rankings

Leef, G. (2003). Accreditation is no guarantee of academic quality. *Chronicle of Higher Education, 49*(30), B17.

Leef, G.C. & Burris, R.D. Can college accreditation live up to its promise? American Council of Trustees and Alumni, 2002. Retrieved April 25, 2006, from http://www.goacta.org/publications/Reports/acrediting.pdf

Lezberg, A.K. (1999). The American system of quality control: Regional accreditation. Retrieved October 7, 2006, from http://www.uta.fi/FAST/US5/REF/usaccred.html

Lindstone, H. & Turoff, M. (1975). *The Delphi method techniques and applications.* Wellesley MA: Addision-Wesley.

Maire, J., Bronet, V., & Pillet, M. (2005). A typology of "best practices" for a benchmarking process. *Benchmarking, 12*(1), 45-60.

Mangrum, R.L. (2003). University related flight training programs in Region VI of the National Intercollegiate Flying Association. (Doctoral dissertation, Oklahoma State University, 2003). *Dissertation Abstracts International, 64*(09), 3218.

Martino, J.P. (1972). *Technological forecasting for decision-making.* New York: American Elsevier Publishing Company.

McCampbell, W.H. & Stewart, B.R. (1992). Career ladder programs for vocational educators: Desirable characteristics. *Journal of Vocational Education Research, 17*(1), 53-68.

McGoldrick T., Jablonski, R. & Wolf, Z. (1994). Needs assessment for a patient education in a nursing department: A Delphi approach. *Journal of Nursing Staff Development, 10,* 123-130.

McMillan, J.H. & Schumacher, S. (1993). *Research in education: A conceptual introduction.* New York: Harper Collins College Publishers.

Merriam, S.B. (1998). *Qualitative research and case study applications in education.* San Francisco, CA: Jossey-Bass.

Millbrooke, A.M. (1999). Aviation History. Englewood, CO: Jeppesen-Sanderson.

Morse, J.A. (2004). Diploma mills. *FDCH Congressional Testimony.* Retrieved April 24, 2006 from the MasterFILE Premier database.

Ohio State University Department of Aviation. Annual Student Learning Outcome Assessment Report, 2000-2001, 1. Retrieved April 8, 2006, from http://www.ohio.edu/provost/upload/AVIATION2000_2001.doc

Oklahoma State University Catalog (2005 – 2006), 118. Retrieved April 2, 2006, from http://www.okstate.edu/registrar/Catalog.html

Patton, M.Q. (2001). Evaluation, knowledge management, best practices and high quality lessons learned. *American Journal of Evaluation, 22*(3), 329-336.

Phillips, W. (2006). Industry seal of approval: What an accredited college offers that others might not. Retrieved January 14, 2007, from http://flighttraining.aopa.org/ft_magazine/fullstory.cfm

Pisano, D.A. (1993). To Fill the Skies with Pilots. Urbana and Chicago: University of Illinois Press.

Professional Flight Technology Plan of Study. (n.d.). Retrieved October 30, 2006, from http://www.tech.purdue.edu/at/academics/undergraduate/flt_pos.cfm

Professional Pilot Degree Sheet. (2005-2006). Retrieved November 1, 2006, from http://www.okstate.edu/education/Aviation/bs_aved.htm

Ray, E. (1997). Can a college education really be reduced to numbers? *Stanford Today.* Retrieved September 3, 2006, from http://www.stanford.edu/dept/news/stanfordtoday/ed9705/9705feal.html

Sacket, D.L., Rosenbery, W.M., Gray, J.A., Haynes, R.B., & Richardson. W.S. (1996). Evidence-based medicine: What is is and what it isn't. BMJ; 312, 72-71.

Sackman, H. (1975). Delphi Critique: Expert Opinion, Forecasting, and Group Process. Lexington, MA: Lexington Books.

Schray, V. (2006). Assuring quality in higher education: Recommendations for improving accreditation. Retrieved August 30, 2006, from http://www.ed.gov/about/bbscomm/list/hiedfuture/reports/schray2.pdf

Skyrme, D. (2002). KM standards: Do we need them? Retrieved April 7, 2006, from http://dev.skyrme.com/updates/u65_fl.htm

Smith, R. (2004). Complementary articulation: Matching qualitative data and quantitative methods. *Proceedings of the Scientific Foundations of Qualitative Research, National Science Foundation*, Arlington, Virginia, July 11-12, 2003, 127-128.

Spangler, S. (n.d.). Aviation colleges: Why you should go and how to select one. Retrieved October 30, 2006, from http://flighttraining.aopa.org/project_pilot/articles/why_college.cfm

Sullivan, E. & Brye, C. (1983). Nursing's future: Use of the Delphi technique for curriculum planning. *Journal of Nursing Education, 22,* 187-189.

Sweet, K.M. (2003). *Aviation and airport security: Terrorism and safety concerns.* Prentice Hall.

Systemwide Aviation/Aerospace Education Program Review. (January, 1994). Aviation/Aerospace Task Force Report to the Oklahoma State Regents for Higher Education

Tan, D.L. (1986). The assessment of quality in higher education: A critical review of the literature and research. *Research in Higher Education, 24*(3), 223-265.

Thomas, A.R. (2003). *Aviation insecurity: The new challenges of air travel.* Amherst, NY: Prometheus Books.

Thompson, N. (2000). Playing with numbers. *Washington Monthly, September 2000.* Retrieved April, 2006, from http://www.washingtonmonthly.com/features/20000/0009.thompson.html

Thorne, S. (2000). Data analysis in qualitative research. *Evidence-Based Nursing, 3*, 68-70.

Times Higher Education Supplement. (2004). Issue 1653, ISSN 0049-3929. Retrieved April 26, 2006, from http://web.lexis-nexis.com/universe/printdoc

Trento, S.B. & Trento, J.J. (2006). *Unsafe at any altitude: Failed terrorism investigations, scapegoating 9/11, and the shocking truth about aviation security today.* Hanover, NH: Steerforth Publishing.

Turoff, M. & Hiltz, S. (1995). Computer based Delphi processes. In M. Adler & E. Ziglio (Eds.), *Grazing into the oracle: The Delphi method and its application to social policy and public health.* London: Kingsley.

United States Department of Education (USDE). (n.d.). Accreditation in the United States. *Overview of Accreditation.* Retrieved May 12, 2006, from http://www.ed.gov/print/admins/finanaid/accred/accreditation.html

United States Department of Education (USDE). (n.d.). Taking flight: Education and training for aviation careers. Retrieved January 14, 2007, from http://www.ed.gov/offices/OUS/PES/higher/civilai2.html

University Aviation Association. (2004, May 19). University Aviation Association releases collegiate aviation guide. Retrieved March 5, 2005, from http://uaa.auburn.edu/04releases.htm

University of Illinois. (2005). College and university rankings: Caution and controversy. Retrieved April 11, 2006, from http://www.library.uiuc.edu/edx/rankoversy.htm

U.S. General Accounting Office. (2003, September). *Aviation security: Progress since September 11, 2001, and the challenges ahead* (Publication No. GAO-03-1150T).

U.S. News & World Report. How we do the rankings. *U.S. News & World Report, 2007Edition, America's Best Colleges,* 77-90.

U.S. News & World Report. How U.S. news collects data: The common data set. Final Version, September 2004. Retrieved March 30, 2005, from http://www.usnews.com/usnews/edu/college/rankingsa/about/cocds_brief.php

Vitalo, R. L. (2005). Six Sigma™ and Kaizan compared: Part 1. Retrieved April 15, 2005, from http://www.vitalentusa.com/learn/6-sigma_vskaizan_1.php

Volkwein, J.F., Lattuca, L., Caffrey, H.S., & Reindl, T. (2003). What works to ensure quality in higher education institutions. In *What Works Policy Seminar on Student Success, Accreditation and Quality Assurance, August 2003,* (1-22). Washington, D.C.: American Association of State Colleges and Universities.

Walleri, R., & Moss, M. (1995). Evaluating and responding to college guidebooks and rankings. *New Directions for Institution Research, No. 88.* San Francisco: Jossey-Bass Publishers.

Washington Monthly (n.d.). A review of the methodology for the U.S. News & World Report's rankings of undergraduate colleges and universities. Retrieved March 30, 2005, from http://www.washingtonmonthly.com/features/2000/norc.html

Webster, D.S. (1984). The Bureau of Education's suppressed rating of colleges, 1911-1912. *History of Education Quarterly, 24*(4), 499-511.

Webster, D.S. (1986). Academic quality rankings of American colleges and universities. Springfield, IL: Charles C. Thomas, 5.

Webster, D.S. (1992). Academic rankings: First on a list of one. *Academe* (September/October), 19-36.

Webster, D.S. & Skinner, T. (1996). Rating PhD programs. *Change 28*(3), 22.

Webster's College Dictionary. (1995). New York: Random House.

Weller, L.D. (1996). Benchmarking: A paradigm for change to quality education. *The TQM Magazine, 8*(6), 24-29.

Wellman, J.V. (2002). Statewide higher education accountability: Issues and strategies for success. In *Higher Expectations: Second in a Series of Essays on the Future of Higher Education.* National Governors Association: Washington, D.C.

Wellman, J.V. (2003). Accreditation and the credit hour. *New Directions for Higher Education, 22*, 57-69.

Welsh, J.F. & Metcalf, J. (2003). Cultivating faculty support for institutional effectiveness activities: Benchmarking best practices. *Assessment & Evaluation in Higher Education, 28*(1), 33-45.

Wergin, J.F. (2005). Taking responsibility for student learning. *Change, (37)*1, 30-33.

West, C.K. & Rhee, Y. (1995). Ranking departments or sites within colleges and education using multiple standards: Departmental and individual productivity. *Contemporary Educational Psychology, 20*, 151-171,

Westerheijden, D., Brennan, J., & Maassen, P. (1994). Changing context of quality assessment: Recent trends in West European higher education.

Willis, G. (1991). Phenomenological inquiry: Life-world perceptions. In E. Short (Ed.), *Forms of curriculum inquiry*. Albany: State University of New York Press.

Wissenschaftsrat, Advisory Body to the Federal Government of Germany. (2004, November). *Recommendations for rankings in the system of higher education and research*, 1-64. Retrieved September 3, 2006, from http://www.wissenschaftsrat.ed/wr_engl.htm

APPENDICES

APPENDIX A

SOLICITATION LETTER FOR NOMINEES AND NOMINATION FORM

<DATE>

<TITLE> <NAME> <LASTNAME>, <POSITION>
<DEPARTMENT>
<ADDRESS>
<UNIVERSITY>
<CITY> <STATE> <ZIP>

Dear <TITLE> <LASTNAME>:

As part of my doctoral program in Occupational Education Studies at Oklahoma State University, I am conducting research to identify quality indicators of exceptional professional pilot programs at four-year institutions. The purpose of this research is to identify the perceived quality indicators of exceptional training programs and is in no way intended to evaluate and/or compare existing professional pilot programs. It is hoped that the results of this research will provide insight into those indicators you believe constitute exceptional programs.

I am seeking your assistance in this research study as <POSITION> of the <DEPARTMENT> at <UNIVERSITY>. I will be utilizing a Delphi technique to complete my research. To be able to utilize a Delphi technique, I will need a panel of experts in professional pilot training programs. A list of potential experts will be generated by representatives from fifty-eight, four-year institutions, such as yours, that offer professional pilot training leading to a terminal undergraduate degree. As a representative of your university, please submit 2 or more names of aviation experts outside your own institution. Enclosed are the criteria for the selection of participants. If you prefer, the submission of names of participants may also be from a person of your choice in your department who you feel is knowledgeable and willing to participate in this nomination process.

Please submit your nominations along with their physical address and email address in the enclosed self-addressed, stamped envelope. Thank you for your participation in this segment of my research study. Your assistance is greatly appreciated. It is my desire that professional pilot training programs in higher education will benefit as a result of this study.

Sincerely,

Dovie (Dee) Brown
Doctoral Candidate
Oklahoma State University

Sincerely,

Dr. Lynna J. Ausburn
Dissertation Advisor
Oklahoma State University

Enclosure

Quality Indicators for Collegiate Professional Pilot Training Programs:

A Delphi Study

Please consider the following criteria for identification of 2 or more nominees to participate in the research study:

1. Nominees must be an aviation faculty member of a four-year institution with a minimum of five years of university experience in a professional pilot training program.

2. Nominees must have experience using electronic mail in order to send and receive messages; experience printing from electronic mail; and have the ability to download and upload computer data files.

Based on the above criteria, I nominate the following person(s): (please print)

Name & Address	Institution	Email	Phone No

The above named individuals will be contacted and requested to voluntarily participate in the research project. Thank you for taking the time to nominate persons who you believe will provide valuable input into the research. Please return this nomination form to:

Dovie (Dee) Brown
16108 Silverado Drive
Edmond OK 73013

OR

Fax to:
405-471-6606

APPENDIX B

LIST OF NOMINEES

LIST OF NOMINEES

✔ indicates participants

Daniel Kelly	Missionary Aviation Institute Piedmont Baptist College 420 S. Broad Street Winston-Salem NC 27101	kellyd@pbc.edu
✔ Cecil Tune	Bob Jones University 10 Opp0ortunity Place Greenville, SC 29607	ctune@bju.edu
✔ Dominic Nicolai	Western Michigan University 237 N. Helmer Road Battle Creek MI 49015	dominic.nicolai@wmich.edu
Thomas McLaughlin	Western Michigan University 237 N. Helmer Road Battle Creek MI 49015	thomas.mclaughlin@wmich.edu
✔ Dr. Richard Mangrum	Kent State University 4020 Kent Road Stow OH 44224	rmangrum@kent.edu
Tim Palcho	Kent State University 4020 Kent Road Stow OH 44224	tpalcho@kent.edu
Prof Raymond Weber	Kent State University	rweber2@kent.edu
Roger C. Taylor	Louisiana Tech University	rtaylor@latech.edu
Gary E. Odom	Louisiana Tech University	godom@latech.edu
✔ Dr. Gerry Fairbairn	Daniel Webster College	gerryf@dwc.edu
Rick Charles	Utah State University	rcharles@cc.usu.edu
Gary Green	Utah State University	gnrgreen@cc.usu.edu
✔ Dr. Rhett Yates	Jacksonville University 2800 University Blvd North Jacksonville FL 32211	ryates@ju.edu
J. Bryan Burrows-McElwain	University Maryland Eastern Shore	jbburrowsmcelwain@umes.edu
Christopher Hartman	University Maryland Eastern Shore	chartman@umes.edu
Dr. Mike Larson	University of Nebraska at Omaha 6001 Dodge Street Allwine Hall 422 Omaha NE 68182-0508	mikelarson@mail.unomaha.edu
George Jacox	Southeastern Oklahoma State Box 4136 Durant OK 74701	gjacox@sosu.edu
✔ Bernard King	Kansas State University	kingb@sal.ksu.edu
✔ Dr. Tom Carney	Purdue University	tcarney@purdue.edu
Darryl Stubbs	Hampton University	Darryl.Stubbs@Hamptonu.edu
Carey L. Freeman	Hampton University	Carey.Freeman@Hampton.edu
Col Ernie Bruce	University of Louisiana at Monroe	bruce@ulm.edu
Jeff Taylor	University of Louisiana at Monroe	jtaylor@ulm.edu

Steven Accinelli	University of Dubuque 3007 Huntington Drive Dubuque IA 52011	saccinel@dbq.edu
Joseph Suarez	University of Dubuque 3007 Huntington Drive Dubuque IA 52011	jsuarez@dbq.edu
✔ Mr. Bruce Chase	LeTourneau University PO Box 7001 Longview TX 75607-7001	BruceChase@Letu.edu
✔ Mr. Phil Rispin	LeTourneau University PO Box 7001 Longview TX 75607-7001	PhilRispin@Letu.edu
Dr. William McCurry	Arizona State University	mccurry@asu.edu
✔ Dr. Alan Stolzer	Parks College of St Louis	stolzeraj@slu.edu
Robyn Litvay	Ohio State University	Litvay.1@osu.edu
Candi Roby	Ohio State University	croby@osuairport.org
Wayne Lutz	Mt. San Antonio College	wlutz@mtsac.edu
✔ Terry Hunt	Oklahoma State University	terry.hunt@okstate.edu
✔ Dr. Fred Hansen	Oklahoma State University	hansenf@okstate.edu
Glen Schaumburg	Oklahoma University Department of Aviation 1700 Lexington Norman OK 73069	gschaumburg@ou.edu
Dr. Manoj Patankar	Parks College of St Louis Parks College of Engineering & 3450 Lindell Blvd St. Louis MO 63103	patankar@slu.edu
✔ Hank Wilson	Henderson State University	wilsonh@hsu.edu

APPENDIX C

REQUEST FOR PARTICIPATION LETTER

Dee Brown

From: "Dee Brown" deebrown1@cox.net
To: <PARTICIPANT>
Sent: Thursday, March 30, 2006 2:31 PM
Attach: informedconsentrev.doc

Subject: Research Study – Quality Indicators for Professional Pilot Training Programs

Dear <PARTICIPANT>:

As part of my doctoral program in Occupational Education Studies at Oklahoma State University, I am conducting research to identify quality indicators of exceptional professional pilot programs in four-year institutions. The purpose of this research is to identify the perceived quality indicators of exceptional training programs and is not intended to evaluate and/or compare existing professional pilot programs. In this regard, you have been nominated by fellow aviation educators to be a participant in this research study in the capacity of expert in professional pilot training programs.

I will be conducting a Delphi study which utilizes a panel of experts to anonymously come to consensus on the topic at hand. You will be asked to respond to three questionnaires via electronic mail. All participants will remain anonymous and all responses will be held in strict confidence.

If you are willing to participate in this research study, please complete the attached consent form and fax to 405-471-6606. Keep the original copy for your records. You will be provided copies of the results upon completion of this research study. If you have any questions or problems, you can email me at dee.brown@okstate.edu or call me at 405-348-1388. I look forward to working with you in this unique research project.

Sincerely,

Dovie "Dee" Brown

Dovie (Dee) Brown
Doctoral Candidate
Oklahoma State University

Sincerely,

Lynna J. Ausburn

Dr. Lynna J. Ausburn
Dissertation Advisor
Oklahoma State University

APPENDIX D

ROUND ONE QUESTIONNAIRE

Quality Indicators for Collegiate Professional Pilot Training Programs: A Delphi Study

Dovie (Dee) M. Brown

INPUT FORM: ROUND 1

Your Name _____

(NOTE: Please be assured we will use your name ONLY to verify your participation. All input revealed to panelists in the Delphi rounds will be completely anonymous.

For this Delphi study, please focus on listing your perceptions regarding the quality indicators for collegiate professional pilot training programs at four-year institutions of higher learning.

Think carefully before you make your initial input. The quality of your input will determine the quality of the study. List specific indicators you believe will be most applicable. Avoid generalizations and ill-defined "wish lists." Give SPECIFIC indicators – things that are indicative of quality professional pilot programs at four-year institutions of higher learning.

List your indicators within the categories below. These categories are provided to augment the thinking process, therefore, please do not let your responses be limited by these categories. Use additional space if needed.

Category I. Facilities

Category 2. Equipment and Technology

Category 3. Faculty

Category 4. Flight/Administrative/Staff Support Services

Category 5. Government (FAA) Compliance

Category 6. Student Organizations

Category 7. Completion Rates

Category 8. Assessment and Evaluation

Category 9. Curriculum and Instructional Delivery

Category 10. Other/Miscellaneous

APPENDIX E

ROUND TWO QUESTIONNAIRE

Quality Indicators for Collegiate Professional Pilot Training Programs: A Delphi Study

Dovie (Dee) M. Brown

FEEDBACK FORM: ROUND 1 AND INPUT FORM: ROUND 2

Your Name _____

(NOTE: Please be assured we will use your name ONLY to verify your participation. All input revealed to panelists in the Delphi rounds will be completely anonymous.)

This round of our Delphi will require you to analyze and evaluate the comments made by the Delphi panel in Round 1. After your thoughtful analysis, you will then make some choices from among the numerous ideas offered in Round 1 and rank order and rate your selections.

To make your Round 2 input, you should carefully study the feedback from Round 1. This is in the form of a list that summarizes the many responses you and the other panelists offered as quality indicators.

First, rate the categories (in the highlighted box) and the items within category (below the highlighted box) using the following scale:

1 – not important
2 – somewhat important
3 – moderately important
4 – important
5 – very important

You MAY NOT introduce any new ideas at this point! However, you are encouraged to make comments to explain answers.

Second, rank order the categories (in the highlighted box) and the items within each category (below the highlighted box) in descending order, with your first choice listed as rank 1 and your *nth* choice listed as rank *n*.

Category *Number and Title*

Category Rating for Importance (1 – 5) (panelist provides)

Category Ranking for Importance (1 – 10) (panelist provides)

Item Number and Name (numbers **do not** imply rank order)	Frequency Listed by Panel (f) in Round 1	Item Rating for Importance within Category	Item Ranking for Importance within Category
1 RESEARCER	*RESEARCHER*	Panelist	Panelist
2 PROVIDES	*PROVIDES*	Provides	Provides
3 THIS	*THIS*	This	This
4 INFORMATION	*INFORMATION*	Information	Information
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Comments:

APPENDIX F

ROUND THREE QUESTIONNAIRE

Quality Indicators for Collegiate Professional Pilot Training Programs: A Delphi Study

Dovie (Dee) M. Brown

Feedback Form: Round 2
and
Input Form: Round 3

Your Name _____

(NOTE: Please be assured we will use your name ONLY to verify your participation. All input revealed to panelists in the Delphi rounds will be completely anonymous.)

This is the final round of the study. In Round 2, you and your fellow panelists rated and ranked recommendations for educators from the list generated by the panel. For each category, a mean (average) rating of importance was calculated. Also calculated was a total of the category's rankings (ΣRank) and its overall group ranking based on this total.

The tables below also show the panel's top ten (10) item selections in each category. The items were selected by assigning "rank points" to each item as follows:

Rank 1 = 10 points
Rank 2 = 9 points
Rank 3 = 8 points
Rank 4 = 7 points
Rank 5 = 6 points
Rank 6 = 5 points
Rank 7 = 4 points
Rank 8 = 3 points
Rank 9 = 2 points
Rank 10 = 1 point
Rank below 10 = 0 points

The rank points earned by each item were summed, to compute a score called "sigma rank points" or ∑RankPoint. Also tabulated was the number of times each item was ranked 10 or above by a panelist regardless of ranking assigned, which was designated as the "frequency" (f) score for the item.
Based on their ∑RankPoint scores, the items in each category were ranked from high to low and assigned item numbers corresponding to the rankings of their scores. Thus, item number 1 became the item with the highest ∑RankPoint score and the highest (#1) rank order. Items ranked below 10 eliminated from further analysis in this Delphi study.

The tables below show the Round 2 results, including category and item rankings, ΣRank and ∑RankPoint scores, and frequencies (*f*) for the items retained for further consideration in Round 3.

To make your input for Round 3, study the results of Round 2 carefully. Then, for the final time, rate the categories (in the highlighted box) and the items within each category using the following scale:

1 – not important
2 – somewhat important
3 – moderately important
4 – important
5 – very important

Second, rank order the categories and the items within each category in descending order, with your first choice listed as rank 1 and your *nth* choice listed as rank *n*.
Do NOT assign any tied ranks.

Category <*Number and Title*>

Round 2 Mean Importance Rating = <*Researcher provides*>
Round 2 Ranking Score (ΣRank) = <*Researcher provides*>
Round 2 Overall Ranking = <*Researcher provides*>

Round 3:
Category Rating for Importance (1 – 5) <panelist provides>

Category Ranking for Importance (1 – 10) <panelist provides>

Item and Round 2 Overall Rank	Round 2 ΣRankPoint	Round 2 Mean Rating for Importance	Round 2 Frequency (f) of Selection in Top 10 in Category	Round 3 Importance Rating (1 – 5)	Round 3 Ranking (1 – 10)
1 RESEARCHER	*PROVIDES*	*THIS*	*INFORMATION*	PANELIST PROVIDES	PANELIST PROVIDES
2					
3					
4					
5					
6					
7					
8					
9					
10					

Comments:

APPENDIX G

IRB APPROVAL FORM

Oklahoma State University Institutional Review Board

Date:	Wednesday, February 22, 2006
IRB Application No	ED06100
Proposal Title:	Quality Indicators for Collegiate Professional Pilot Training Programs: A Delphi Study
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 2/21/2007

Principal Investigator(s

Dovie (Dee) Brown
16108 Silverado Dr.
Edmond, OK 73013

Lynna Ausburn
217 Willard
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 415 Whitehurst (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Sue C. Jacobs, Chair
Institutional Review Board

APPENDIX H

PARTICIPANT CONSENT FORM

PARTICIPANT CONSENT FORM
Fax 405-471-6606

I,_____, hereby agree to participate in the research project conducted by Dovie (Dee) Brown to provide information about quality indicators for collegiate professional pilot training.

In understand that my participation in this research is voluntary, that there are no special incentives for my participation, that there is no penalty for declining participation, and that I am free to withdraw my consent and participation at any time.

I understand that the purpose of this research is to identify the quality indicators of professional pilot training programs at four-year institutions.

I understand and agree to the following conditions regarding my voluntary participation in the research:

1. My participation will involve completion of a questionnaire (Round 1) of a Delphi study and ranking and rating of comments/statement provided as feedback from Round 1 for my completion of Rounds 2 and 3. This will take a total of about 3 – 5 hours of my time over the course of three rounds of input.
2. My responses will be anonymous and treated with complete confidentiality.
3. My responses will be collected and placed in a locked file, where they will remain until analyzed by Dovie Brown. No one else will see my input data, and the data will be secured by Dovie Brown at all times.
4. The data yielded from this research will be used solely for research.
5. No procedures are experimental or involve any risk to participants which are greater than those ordinarily encountered in daily life.
6. Names of participants as provided on the Delphi questionnaires will be used solely to verify participation and allow follow-up contact to increase participation. When all data has been obtained and recorded all names will be removed and no longer identifiable even to the researcher.
7. The project director in the research is Dovie (Dee) M. Brown. Questions regarding this research should be directed to Dovie M. Brown, 16108 Silverado Drive, Edmond OK 73013 or Dr. Lynna Ausburn, at Oklahoma State University at 405-744-8322. For information on subjects' rights, contact Dr. Sue Jacobs, IRB Chair, 415 Whitehurst Hall, 405-744-1676.

I have read and fully understand this consent form. I sign it freely and voluntarily. A copy has been given to me for my personal record.

Date: _____ Time: _____(a.m./p.m. –please circle)

Signed: _____
(Signature of research participant)

I certify that this form has been explained to the participant or his/her representative before requesting the participant to sign it.

Dovie M. Brown
03/29/06 Project Director

Signed: _____

APPENDIX I

COPYRIGHT PERMISSION

Dee Brown

From: "permissions" <permissions@sagepub.com>
To: <deebrown1@cox.net>
Sent: Tuesday, April 18, 2006 7:59 PM
Subject: RE: Permissions

Dear Ms. Brown,

Thank you for your request. Please consider this written permission to adapt Figure 11.2 from Creswell's Research Design for use in your dissertation. Please let us know of any other usage of the material.

Best,
Karen

Karen Wiley
Permissions Supervisor
Sage Publications, Inc.
2455 Teller Road
Thousand Oaks, CA 91320-2218
Phone: (805) 499-0721, Ext. 7735
Fax: (805) 499-0871
www.sagepub.com

-----Original Message-----
From: deebrown1@cox.net [mailto:deebrown1@cox.net]
Sent: Sunday, April 16, 2006 4:55 PM
To: permissions
Subject: Permissions

Email: deebrown1@cox.net

Name: Dovie M. Brown
Affliation: Oklahoma State University
Address: 319 Willard Hall
City: Stillwater
State: Oklahoma
Zip: 74078
Phone: 405-348-1388
Reference Code:
Title_of_publication: Research Design
Type_of_publication: Book
Type_of_Pub_Other:
Isbn_issn: 0-7169-2442-6
Pub Date: 2003
Volume_Issue:
Title_of_Material: Figure 11.2
Authors_of_Material: John W. Creswell

Portion_of_material: 1 table/figure
Page_Range: 213
Type_of_use: republish in a thesis/dissertation
Type_of_use_Other:
Purpose_of_use: Academic
Distribution_qty: 10
Title_of_your_publication: Quality Indicators for Collegiate Professional Pilot Training Programs: A Delphi Study
Requestor_type_of_publication:
Author_Editor_your_publication: Dovie (Dee) M. Brown
your_publisher_distributor: Oklahoma State University
Estimated_pub_date: July 2006
Entire Publication:
Other_Use_of_Material:
Comments: I have adapted figure 11.2 to illustrate my model for a Sequential Exploratory Research Model that reflects the Delphi research technique. The adaptation would be so noted in the caption of the figure.

4/18/2006

VITA

Dovie (Dee) Maria Brown

Candidate for the Degree of

Doctor of Philosophy

Dissertation: QUALITY INDICATORS FOR COLLEGIATE PROFESSIONAL PILOT TRAINING PROGRAMS: A DELPHI STUDY

Major Field: Occupational Education Studies

Biographical:

Personal Data: Born August 30, in Frankfurt, Germany

Education: Graduated Summa Cum Laude, Bachelor of Business Administration from the University of Central Oklahoma, Edmond, Oklahoma in 1975; Master of Science Degree, Aviation Sciences from Oklahoma State University, Stillwater, Oklahoma in December 2000; Completed the Requirements for the Doctor of Philosophy degree at Oklahoma State University in May, 2007.

Experience: Presently working as a Research/Teaching Assistant at Oklahoma State University including Course Curriculum Development, Grant Writing, and On-Site Training. Management and Program Analyst (Internal Consultant), Federal Aviation Administration, Oklahoma City, OK. Owner/Manager of two small businesses, Woodward, OK. Community Volunteer Work for Rural Economic Development Council, Eufaula, OK. Management support positions including: Procuring Agent, Inventory Management Specialist, Aerospace Engineering Technician, Equipment Specialist, and Computer Programmer with the Department of Defense, Tinker AFB OK.

Professional Memberships: Omicron Tau Theta; American Education Research Association; Rocky Mountain Educational Research Association; University Aviation Association.

Name: Dovie (Dee) Maria Brown Date of Degree: May, 2007
Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: QUALITY INDICATORS FOR COLLEGIATE PROFESSIONAL PILOT TRAINING PROGRAMS: A DELPHI STUDY

Pages in Study: 191 Candidate for the Degree of Doctor of Philosophy

Major Field: Occupational Education Studies

Scope and Method of Study: The purpose of this study was to identify the quality indicators that comprise an exceptional collegiate professional pilot program as identified by a national panel of experts in aviation higher education. A Delphi panel of 13 experts participated in a 3-round Delphi to identify quality indicators in 9 categories. This was accomplished through generation of qualitative comments in the first Delphi round, following by rating and ranking of categories and items within categories in 2 subsequent rounds.

Findings and Conclusions: The Delphi panel of experts provided their perceptions of quality indicators within 9 categories and were in clear agreement concerning the relative importance of categories and items within categories. The categories in descending order of importance were: Faculty; Equipment and Technology; Curriculum and Instructional Delivery; Government (FAA) Compliance; Facilities; Assessment/Evaluation; Flight/Administrative/Staff Support Services; Completion Rates; and Student Organizations. Analyses of panelists' overall comments were based on ΣRank scores, mean ratings for importance, and tier analysis. In the top-rated category, the issue of faculty pay was identified as the most important quality indicator for collegiate flight training programs. Other important issues included the need for programs to utilize technologically advanced aircraft (TAA) and/or flight simulators for flight training; use of real-world scenarios or activity-based learning; fully comply with FAA regulations; provide adequate space for all types of training and maintenance; formally assess higher order thinking and learning skills; provide administrative support staff; monitor completion rates; and involve faculty and students in various collegiate aviation organizations. Overall, panelists identified quality indicators that represented best practices but did not provide benchmarks for measuring program quality. The findings of this study could be used as a starting point from which to further identify benchmarks for determining flight training program quality.

ADVISER'S APPROVAL: Lynna J. Ausburn