21st Century Aviation Safety Requirements Necessitates a Practicum in Postsecondary Educational Safety Programs.

("Post-Secondary Academic Safety Programs and the Need for a Practicum in Training")

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Abstract

This study explored the lack of preparedness that postsecondary graduates possess, which has prevented aviation safety managers from having a dependable pool of reliably trained and prepared safety professionals to select from. Given the challenges in preparing graduates as career ready, along with the dynamic nature of the aviation and aerospace industry, this case study was designed to examine postsecondary academic program graduates readiness in meeting the needs and requirements of safety program management within the aviation and aerospace industry. Fifty-Five participants were purposefully selected for interviews from safety professionals currently working at airports to help examine the needs and requirements of the aviation and aerospace industry safety programs. As patterns through individual interviews emerged, considerations through inductive analysis were used to find any possible connections of the information being compiled.

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Chapter 1: Introduction

Over the last 10 years, safety has been scrutinized in the aviation industry, leading companies to create and implement a systems safety management approach for their businesses. In response to this scrutiny, Hays (2012) questioned if university graduates in aviation/aerospace safety are properly prepared to begin their careers and meet the needs and requirements of the aviation/aerospace industry. As explained by Guidry (2012) there is no commonly held definition of "career-ready." Given the multifaceted nature of the challenges associated with preparing individuals to be career-ready, many stakeholders have assumed ownership in addressing the issue workforce preparedness.

Background

Given the requirements of advancing technological workforce needs, the expectations of a prepared graduate are even greater. Individuals are career-ready when they have acquired the necessary knowledge and skills to enroll and succeed in a 2- or 4-year college, trade school, or technical school without needing remediation (Guidry, 2012). Career readiness involves three major areas: core academic skills, that is, the ability to apply those skills to concrete workplace situations; employability skills, such as critical thinking and responsibility; and technical, job-specific skills related to a specific pathway (Denby, 2010).

Aviation system technology for safety is designed for reducing hazards, eliminating recurring accidents, and lessening accident and incident consequences (Fleming, Spencer, Thomas, Leveson, & Wilkinson, 2013). The only way to avoid incidents and accidents before occurring is to accurately detect possible personnel risk areas, such as hazardous material, vehicle movement areas, and airport ground markings.

Combining safety-requirements and safety-specific functions and technology within the aviation and aerospace industry, as well as implementing safety-focused training, is required for the air transportation system to achieve its advancing safety goals (Herrera, Nordskag, Myhre, & Halvorsen, 2009). A primary consideration in the design of safety management academic programs is to help increase graduate preparation across a vast area of aviation and aerospace topics, defined by the goals and decision tasks for a safety manager's job (Darche & Stam, 2012).

Statement of the Problem

The teaching of theoretical information by postsecondary academic safety programs has resulted in a lack of preparedness of postsecondary graduates; this has prevented aviation safety managers from having a dependable pool of reliably trained and prepared safety professionals to select from. Today's top aviation universities teach not only curricula associated with flight training but academic programs in the area of aviation/aerospace safety. The intent of these programs is to meet the industry's needs and requirements pertaining to the safe movement of aircraft, ground equipment, and people. The mission of the technical postsecondary institution is to teach the science, practice, and business of aviation and aerospace. Safety programs must prepare students for productive careers and leadership roles in service around the world to meet goals related to student success and the needs and requirements of the aviation/aerospace industry (Byers, 2012). Therefore, this case study was designed to research both the commonalities and differences of the top aviation/aerospace academic programs, along with the current needs and requirements of the aviation/aerospace industry (Denby, 2010).

In addition, the research effort collected information on projected safety needs and future requirements of the aviation/aerospace industry for future analysis and research opportunities (Feller, 2009). The results can lead to continued innovation and program relevance, as well as a process to annually assist in collecting information on future safety industry needs.

Purpose of the Study

The purpose of this qualitative research was to gain insight regarding the current needs and requirements of the aviation/aerospace industry through a case study analysis. Participants were 55 safety professionals currently working at airports and purposefully selected (Hatch, 2002; Stake, 2010). Universities need to review and maintain currency regarding current and future industry employee skill and knowledge needs. This can assist in linking those needs to their curriculum and academic safety program outcomes to help ascertain the readiness of program graduates to meet the employment needs of the industry. Most institutions currently do not monitor the academic preparedness of graduates entering the safety field (D. Johnson, personal communication, October 15, 2013). In fact, even though organizations continue to stress safety, in times of economic downturn, personnel levels in safety and training may be reduced before operational personnel (D. Johnson, personal communication, October 15, 2013). This case study was designed to provide information on skill and knowledge gaps that can lead to future research and help ensure that graduates continue to meet and exceed current and future industry needs, even in the event of reduced personnel levels.

Theoretical Framework

An appropriate theoretical framework for this study addressed curriculum implementation and the consistency in preparing the student for service within the aviation and aerospace industry. One of the more prevalent frameworks associated with student preparation and an appropriate framework for implementing an academic program in education is the constructivist theory. Takaya (2008), defining the relationship between the constructivist theory and student preparation, stated that education as an institution presents useful information and images of useful life, each in a somewhat associated form. But it does not mean that it necessarily sets a certain limit upon the information, meanings, and values that individuals build upon. As will be discussed below, students learn and support knowledge construction through learning by doing.

Constructivist theory. DuFour, DuFour, Eaker, and Many (2006) stated that learning by doing develops a deeper and more profound knowledge and greater commitment rather than learning by reading, planning, or thinking. Learning by doing ensures that each member of the educational process takes ownership in adapting to change. Constructivism is the theory that supports the idea of the importance of experience in education, and is a theory of learning and gaining knowledge that evolved from the work of Piaget and Vygotsky (as cited in Liu & Chen, 2010). Piaget and Vygotsky observed student-centered instructional beliefs and concluded that experience is vital in student learning and retention (Bruner, 1997). Constructivism is describes how students arrange the foundation of knowledge gained to make sense to them. Their knowledge and understanding are built from preexisting information. Based on the

concept that learners actively develop their own explanations of the world around them, it is generally accepted that there are different versions of constructivism (Liu et al., 2010).

The constructivist paradigm can focus on the individual, as with Piaget, or the social construction of information, as with Vygotsky (Bruner, 1997). Piaget's work is regularly thought of as the pivotal work in psychological constructivism, and includes key concepts such as plans, incorporation, accommodation, uncertainty, and equilibrium (Harlow, Cummings, & Aberaasturi, 2006). Piaget views the learner as both a mentally and physically active student engaged in experimentation. The learner constructs knowledge through a process whereby the standard beliefs and understandings are challenged through collaborations with the environment that will require the learner to consequently revise or modify those belief systems to match their experiences (Harlow et al., 2006).

Vygotsky's work is central in the community version of constructivism. Vygotsky stressed how social interaction affects knowledge creation (Bruner, 1997). The knowledge that learners construct is directly linked to the social environment where the knowledge gained was experienced and understood (Liu & Chin, 2010). According to Vygotsky, the primary tool that guides knowledge construction is scaffolding, which comes when more experienced members of the social environment provide assistance or modeling appropriate behavior or thought processes (Bruner, 1997).

Student-centered learning. Constructivism directly involves the student, the knowledge gained, and the connection between the student and the knowledge that is gained (Liu & Chin, 2010). With constructivism, there is an importance on the student being exposed to new ideas and experiences in a learning environments being brought up,

or facilitated, by the teacher, instead of a direct communication, or lecture, from the teacher. Constructivism supports the idea of the student taking the central role in his or her own learning.

The student may take three roles through constructivism: an active learner, a social learner, or a creative learner (Becker, 2004). The active learner is a learner who actively attains knowledge and understanding through discussion, debate, conjecturing, and inquiry. The social learner socially builds knowledge and understanding through a dialogue with others. The creative learner creates or recreates knowledge and understanding. For the creative learner, it is not enough to just be active; but instead, the creative learner needs to experience the discovery of theories. Regardless of the role taken, the student still accepts the prime responsibility in learning and preparation (Becker, 2004).

Learners attain knowledge through collaboration between their existing mental structures or paradigms and their new experiences. Constructivism, unlike the more traditional transmission theories of learning, suggests that learners develop distinctive understandings of phenomena and do not simply store away the knowledge conveyed by teachers (Fosnot, 1993). An additional key difference between the constructivist theory and the traditional transmission theory of learning is the extent to which learners are able to integrate their knowledge into complete comprehension. Whereas the transmission approach tends to be much more focused on recalling specific bits of knowledge without regard to context, the constructivist approach emphasize both the context and aspects of knowledge (Fosnot, 1993).

Through the constructivist paradigm, knowledge is learned when intellectual stability is directly challenged, and then the primary role of the teacher becomes that of a facilitator and to pose problems that stretch learners to a point of academic questioning (Becker, 2004). Once this point is reached, the teacher may provide students with opportunities to manipulate objects and work together on solving problems, and to think about and collaborate on newfound areas of possibilities as they actually experience them.

Summary. The constructivist practice of instruction turns the traditional process upside down. While the teacher is an information resource and may direct the classroom group, in the constructivist paradigm a teacher is not the sole proprietor of knowledge and the critic of performance (Becker, 2004). The constructivist paradigm requires students to build their own knowledge structures and to create their own base of understanding (Hyslop-Margison et al., 2008). It strives to train students in the effective practice of reasoning, and to use concepts and principles in their lives by stressing that learning involves acquiring aspects of an intellectual practice rather than just acquiring information and data.

The methodological approach of the constructivist paradigm may help improve postsecondary academic program graduate preparedness in a way that the traditional teaching method could not (Liu et al., 2010). For college program graduates to be ready to perform in an industry of their choosing, the constructivist method may assist graduates with being innovative, develop reasoning skills, and improve the collaborative process (Hausfather, 2001). The preparation, development, and readiness to perform and

to be career ready and operate within the needs and requirements of any industry are a basic purpose of the educational system.

Research Question

The problem with aviation professionals not having a dependable pool of reliably trained and prepared safety professionals from which to select led to the overarching research question. Taking into account the possible lack of consistency pertaining to academically trained safety professionals, it is important to gather information from more experienced safety professionals currently working in the aviation and aerospace industry. Thus, the research question driving this study follows:

Q1: What are the perceptions of industry safety professionals in aircraft and airport safety management on the academic training of safety professionals in the United States?

Nature of the Study

This study used a qualitative case study design and interviews with aviation and aerospace industry safety professionals to examine the needs and requirements of the aviation and aerospace industry safety programs. Case study research offers a broad array of prospective philosophical positions that underlie the qualitative research design and approaches for its design (Stake, 2010). Those broad positions lead to a basic belief system or choices, such as single case study and safety personnel experience.

The population involved in this case study was aviation and aerospace safety professionals of organizations selected within the aviation and aerospace industry. Participants were purposefully selected through LinkedIn recruitment (Hatch, 2002) based upon their experience level, accomplished training, and seniority in safety

management. Sampling was addressed through open interviews, conducted so that interviewees were given more opportunity to speak candidly and honestly, while explaining their unique perspectives on issues at hand (Hatch, 2002). Interview questions (see Appendix A) were derived from the literature review.

To maintain an ethical approach, the initial research questions were linked to the case study protocol and the case study protocol to data collection methods. The names associated with the data collected through the interview responses remained anonymous and interview responses documented in the final report were not attributed to any one specific individual. There was minimal risk to the participants of this study because the data being sought posed little or no risk to personal or professional activities (Creswell, 2009).

Significance of the Study

Aviation is closely associated with safety, not so much because of a high rate of incidents but because of the ultimate consequences if something goes wrong (Fleming et al., 2013). Safety managers must understand hazards as well as risks, and safety managers overseeing a safety program need to be properly trained and career ready to work within the aviation and aerospace industry (Herrera et al., 2009). Interviewing professionals serving in safety could identify relevant commonalities among post-secondary academic safety programs (Barnett, 2008). Discovering how industry safety professionals in aircraft and airport safety management perceive academic training of safety professionals in the United States may help the trainers better prepare the safety program graduates to work in the aviation and aerospace industry.

Summary

The problem addressed in this study is the teaching of theoretical information by postsecondary academic safety programs has resulted in a lack of preparedness of postsecondary graduates; this has prevented aviation safety managers from having a dependable pool of reliably trained and prepared safety professionals to select from. Through the relevant designing of safety management academic programs, there is a hope to help increase graduate preparation across a vast area of aviation and aerospace topics, defined by the goals and tasks for a safety manager's career (Darche & Stam, 2012). Additionally, increasing consistency among training programs may result in a better pool of prepared graduates to pull from. This study used a qualitative case study design, per Stake (2010) and Hatch (2002). Interviews of aviation and aerospace industry safety professionals identified the needs and requirements of the aviation and aerospace industry safety programs.

Chapter 2: Literature Review

To help gain an insight regarding the differences of the top aviation/aerospace academic programs along with the current needs and requirements of the aviation/aerospace industry, it helps to understand not only what the needs and requirements are, but also what may be accomplished in training, safety, and management. Every postsecondary institution has a mandate: to prepare graduates to be ready to perform in the industry of their choosing (Walker, 2009). Furthermore postsecondary institutions have a responsibility to industry through partnering and providing the relevant curriculum pertaining to meeting industry needs and requirements (Whitehurst & Rantz, 2012). University academic programs and the majors that students select fall within this domain of needing to meet the industry needs and requirements.

Aviation and aerospace concerns more than flight or the aircraft itself. Aviation and aerospace also concerns people and retaining properly trained, certified, and educated personnel to help ensure the safe movement of machinery and passenger alike (Denby, 2010). Safety professionals are needed to help ensure programs, policies, and procedures are not only adhered to but developed and understood (Yi, 2012). It is not uncommon during economic downturns in the aviation/aerospace industry to cut back on training opportunities and the personnel that would oversee safety management programs (Fiorino, 2010). Personnel who are forced to accept more responsibility and who have still fewer training opportunities, or may not have been initially trained or educated properly for the task at hand, may worsen a given situation (Fiorino, 2010).

The traveling public naturally assumes a certain amount of risk when they fly, but travelers still expect and require a safe experience overall. A proactive approach to

safety management can sometimes be sacrificed for reactionary management, or in other words, waiting until an incident or accident occurs before trying to minimize any associated risk (Stolzer, Halford, & Goglia, 2011). This can result when management has a false sense of security when an industry or organization has not had an incident or accident (Stolzer et al., 2011). The issue that can arise from the reactionary approach is that safety may not be reexamined until a tragic incident or accident has occurred (Esler, 2009). A high standard, and an expectation that aviation and aerospace personnel are ready to perform in the aviation and aerospace industry, should be met through the preparation of graduates of postsecondary academic programs (Hays, 2012).

Through research of the aviation and aerospace industry, safety management, and educational support opportunities, the overall research purpose emerged. Current literature pertinent to this study addressing graduate preparedness and aviation and aerospace safety training was researched through the Hunt Library of Embry-Riddle Aeronautical University, the EBSCOHost database, and the Proquest database. Keywords included *safety culture*, *aviation safety*, *academic program design*, and *graduate readiness.*

Safety Culture and Climate

One of the most commonly used leading indicators of safety is safety climate. The term *climate* in this case is explained as a summary of perceptions that employees share about their work environment (Stolzer et al., 2011). Safety climate describes employees' perceptions, attitudes, and beliefs about risk and safety. It is the current indicator of the safety culture in the organization, in other words, how the importance of safety is perceived by the personnel of the organization at the present time (Atak &

Kingma, 2011). Safety culture reflects the lasting fundamental values, norms, assumptions, and expectations, which may be shared in a society's culture (Jin & Chen, 2013). Climate, on the other hand, is thought to represent a more temporary and observable display of the culture--in other words, what the mood is for the day, and whether that mood having a positive or negative effect on worker safety (O'Connor, O'Dea, Kennedy, & Buttrey, 2011).

Safety programs are an essential aspect of an aviation organization's safety management system (Jin et al., 2013). These safety programs can improve job-site safety performance by reducing incidents and injuries, enhance safety culture or climate, prevent project delays, and build positive company image (Freiwald, Lenz-Anderson, & Baker., 2013). The emphasis of management support is important to the development of a safety culture (Freiwald et al., 2013). Aviation and aerospace companies that are involved in the manufacturing, operation, and maintenance of aircraft heavily invest in safety measures, and cautiously guard both their reputation and public image through the use of safety data. However, safety is not an empirically given condition that comes naturally to a business organization; rather, it is socially built. It is built by means of management stressing the importance of both organizational safety standards and organizational safety practices, and their personnel being trained to understand the importance of safety (Atak et al., 2011).

Safety professionals have discussed the use of the terms *culture* and *climate*, and what these terms represent (Stolzer et al., 2011). The general consensus is that culture represents the more stable and lasting qualities of the organization, and may be likened to that of human personality (Jin et al., 2013). An organization's safety program is greatly

affected by the management of the safety program, and both the education and career readiness of the personnel in turn can affect management (Stolzer et al., 2011). The managers utilizing the safety management approach need to create processes to cultivate an awareness that should promote error free performance (Bjornsen, Nash, & Jones, 2012). The successful implementation of this safety approach involves safety awareness at all levels of program/project management teams.

Management through Safety Systems

A safety management system (SMS) is defined as a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies, and procedures (Yi, 2012). The goal of the safety management approach is to create superior safety performance on organizational projects and to define personnel roles, responsibilities, programs, policies, and procedures to help realize this safety performance goal (Lu, Schreckengast, Ropp, & Dillman, 2011). System safety is the application of both engineering and management principles, thereby joining both science, and business techniques to achieve an acceptable level of safety throughout all aspects of an organizational system (Stolzer et al., 2011). Achieving this characterization of system safety is the main objective of SMS (Yi, 2012). A well-constructed SMS can provide an organized, unambiguous, and complete management method for minimizing the risks within an organization (Yi, 2012). The SMS process includes goal setting, planning, documentation, and regular evaluation of performance to ensure that goals and requirements are being met. In order to bring safety understanding to management the Federal Aviation Administration (FAA) is in the process of devising a comprehensive plan to implement an SMS requirement for the aviation and aerospace industry (Remawi,

Bates, & Dix, 2011). This process will allow aviation and aerospace organization managers to take into account safety and manage through the empowerment of personnel as the subject matter experts of the organization. SMS encourages safety as part of the decision-making management process, just like any other aspect of managing an organization (Esler, 2009).

Building an overall safety approach within an organization, in the most efficient manner, requires an organization to adopt a systems method to safety management (Lu et al., 2011). All levels of an organization need to become a part of a culture that promotes and practices both safety and risk reduction mitigation (Stolzer et al., 2011). Safety management is built upon the principle that there will always be safety hazards and human errors, both of which an organization should be aware of, and hope to lesson any harmful effects (Stolzer et al., 2011). SMS creates a process to improve communication about these risks and take action to minimize them. This method can consequently improve an organization's overall level of safety (Lu et al., 2011).

Implementing a well-organized and relevant SMS program may not come naturally, and at the present time there are only two developmental processes (Stolzer et al., 2011). The first is to contract out to a company that will develop a tailored safety management system for an organization. The problem with this approach is the contracting company may not fully understand the organization, and if there are later updates or revisions required the organization may not know how to accomplish this (Fiorino, 2010). This could cause future reliance on a contractor. The second approach is to have trained career ready personnel in place that can devise an SMS within the

organization itself. This ensures the company not only understands the process, but it effectively keeps the costs of development and updates manageable (Stolzer et al., 2011).

Once known as soft skills, communication and decision making are now becoming highly sought after by the aviation and aerospace industry. College graduates understanding and using communication and leadership skills are at an all-time low because of a lack of social interaction that usually aids in developing the requisite skills (Barnes & Slate, 2013). This is not to say that academic programs do not prepare a graduate theoretically, but academic programs can have a profound effect on the skills that would make a graduate career ready for employment (Vincoli, 2006).

Skills required within safety management are communication, situational awareness, and decision making. The aviation and aerospace industry are looking for those skills when personnel are hired (Leib et al., 2013). If an academic program does not develop these skills, the organization must develop them in graduates (Leib et al., 2013). Budgets must be established to develop, implement, and maintain this training both initially and as recurrent training becomes required (Stolzer et al., 2011). The combination of staff and training activities that helps support the implementation and operation of a safety program in an organization is fundamentally important to help ensure the training and education of all the employees to the specific conditions and environment in which they will be working is achieved (Leib et al., 2013). As budgets become more scrutinized and funding is harder to both justify and find employing an in-house training department often times becomes a luxury that an organization cannot financially afford to maintain.

The international governing body for air transportation, International Civil Aviation Organization (ICAO), requires that airports must devise an SMS as a way of guaranteeing safe operations and eliminating or reducing the likelihood of incidents and/or accidents (Remawi et al., 2011). An SMS helps create a solid safety culture which in the long term helps the organization by developing a sound business practice (Yi, 2012). The problem with this, however, is practitioner inexperience in creating an SMS when organizations have been forced to outsource and pay contractors to create this requirement (Remawi et al., 2011).

Effects of Safety Programs on the Aviation/Aerospace Industry

The FAA and Congress have aggressively pursued new rules and new laws aimed at creating the fail-safe airline professional, one who must meet more rigorous training and hiring requirements (Fiorino, 2010). No one is arguing the safety benefits, and no one yet knows the impact on operations or costs. One way the industry looks to keep costs down is by hiring a better trained and career ready professional from academic institutions (Yi, 2012). Proposed rules would enhance initial and recurrent training standards for those hired in airport and airline operations, which points to a higher standard of training for those graduating from academic institutions with hopes of working in the safety field (Fiorino, 2010). Safety is critical to the success of the aviation and aerospace industry, and as air travel continues to develop globally and link more people and places, how aviation safety is maintained and overseen will continue to be a global concern (Leib et al., 2013).

For an airline, and to some extent for an airport to prosper financially, safety is a prime concern. The safety record of a company instills public confidence, and yet it will

always be a risk-filled profession (Lu et al., 2011). This safety record can also be looked at as the airline's reputation. For a department that has such importance to impact both company confidence and reputation, it is imperative to hire the most career-ready graduates from the top academic programs in safety (Fiorino, 2010).

To have the desired academic program stay relevant in an industry that strives on change it must make partnerships among the academic institutions and the industry itself. Guidry (2012) stated that in the late 1980s and early 1990s, the disconnect between the skill set of the emerging and incumbent workforce and the requirements of the workplace came into focus. Employers increasingly questioned the readiness of their job applicants. Yet this question of readiness need not exist today. The flying public usually obtains safety information from the moment they enter the airport. To ensure flight safety, the carriers typically follow standard procedures in providing both preflight and onboard safety information (Chang & Liao, 2009). This information is what instills the confidence in an airline.

Traveling on an aircraft implies a certain amount of risk taking. As is true for other services, buying an airplane ticket implies various categories of risk, such as financial risk, social risk, and psychological risk. Unlike most other services, air travel also exposes passengers to physical risk. Even though the airline industry claims that safety is its number one priority, the occurrence of accidents cannot be eliminated completely, which passengers realize (Ringle, Sarstedt, & Zimmermann, 2011).

The consumer may even believe air travel as more dangerous than is justified from a detached point of view because individuals generally judge the risk associated with low-probability events. Furthermore, airline disasters are extensively covered by the

media, which contributes to public awareness of such accidents. Aviation system processes for safety are aimed at managing risk, minimizing the hazards, eliminating recurring accidents, and mitigating accident and incident consequences (Davey et al., 2010). For the public to have loyalty to an airline or even an airport there must be a sense of feeling safe by that of the passenger.

Although a topic of interest, little has been done to address pilot fatigue, crew rest requirements, and federal regulations (Whealan-George, 2013). The traveling public may believe that changes are not being made, or their safety is not a priority. Safety perceptions may go the same route as security perceptions; that is, both processes are all for show and not relevance. The negative impact can cause the number of travelers to decrease, which in turn cause prices to increase (Fiorino, 2010).

Normally airlines try to establish a pleasant image of flying for air travelers, with a desire to make them feel comfortable and have them for return business. Airlines do not wish to cause or increase passenger anxiety by highlighting emergencies, and how airline passengers should make themselves prepared for such statistically possible emergencies (Byers, 2012). Additionally, airlines tend to overemphasize the service role of their cabin crew, which may cause some passengers to ignore the cabin crew's safety role and in-flight safety demonstrations and build a perception of wait staff instead of aviation professional (Chang et al., 2009). One can understand why aviation marketing is geared to comfort, fees, and baggage and not overtly to the overall safety record or mishap-free flying an airline has accumulated, because the passenger expects safety but looks to pay for comfort.

Theory with Practice Leads to Experience and Readiness

Kaplan (2012) stated the importance of positioning theory into practice can be addressed and advocated to educators and students through the presentation of a continuum of practice. Additionally, the connection between theory and practice could easily be a consequence of the misconception that practice is associated with students who struggle (Young, 2008). The concept of practice as repetition without complexity could be viewed as a threat rather than an enhancement to the potential of gifted students who learn quickly. Another reason why theory is not readily converted into practice is due to the lack of models and modeling that endorse the importance of, and practicality to practice (Torrance, 2007).

Theory taught is the basis of all follow-on implementation and innovation (Young, 2008). Without the building blocks students and educators alike will not have the tools necessary to ensure understanding has taken place. This form of practice requires educators and students to observe and gain recognition of the extent of what constitutes the concept, skill, or relevance, part to whole relationship, practicality, and so on (Kaplan, 2012).

Hong et al. (2011) further explained the two main instructional goals as helping students to better understand the complex relationships between theory and practice, and helping students develop a more informed and practical view about knowledge building. Knowledge building comes from the three-step approach mentioned earlier; it takes the student from theory, to practice, to experiential (Crossouard & Pryor, 2012). A solid foundation in a specific subject is one, in which the student can take a learned theory, and apply it in a practical situation. The student has to learn theories in order to apply them

in the actual context (Sadler, 2009). Therefore, expertise is achieved through a solid theoretical and experiential foundation, and the stronger this foundation is, the broader the expertise can become.

When teaching technical, mathematic, or science-based courses, it is important to lay the foundation through explanation of the theoretical principals (Torrance, 2007). Rockland et al. (2010) stated engineers are constantly making judgments about design, materials, and basic theory as they engage in problem solving. Because engineers recognize that answers to problems are only as good as the understanding that supports them, and that sometimes explanations must be offered with incomplete knowledge, they view making constant knowledge improvement central to their work (Chai & Tan, 2009). Knowledge improvement is why the engineering design process may be compared with the scientific inquiry process (Sadler, 2009).

To understand the direction the practice may take, the overall process of understanding the theory needs to occur first. In education, students are expected to perform with a readiness that was not expected of past generations (Chai et al., 2009). The graduate is required to be able to function in a high-paced, technological environment (Rockland et al., 2010) because of the technology skills that today's generation possesses, and because of the skill readiness that students need to learn.

Today's young generation is looked upon as being more naturally technologically advanced than any other generation known to date (Rockland et al., 2010). They have grown up with computers, digital imagery, and satellite television. The Internet will be part of their entire lives, and the world around them has become smaller. This generation has possession of smart phones and can an answer queries and access data at the push of

a button. They have social networks that enable them to communicate with each other in every part of the world. This generation does not know the meaning of science fiction, because for them it is reality (Rockland et al., 2010). For the graduate to retain the experiential knowledge, and be able to practice in this environment as a functioning professional, it is not enough to have the ability to utilize the technology, but it is required to understand its most basic theory, and that is what must be taught for the full understanding to transpire (Denby, 2010).

Crossouard and Pryor (2012) stated theory, whether articulated or not, is productive of the practices of some sort of a formative assessment. Rather than separating the knowing subject and knowledge, education, and therefore learning, becomes contingent upon the positioning of the educator and the particular spaces of their interactions with their students. Kaplan (2012) added to this when he stated, theories that define education and the objectives of curriculum are expected to accomplish for these learners, educators also should advocate for theory into practice. Addressing theory without commensurately addressing practice has resulted in the loss of some of the effectiveness that should accompany education (Sadler, 2009). It has been considered by some, that educators have been lost in the rhetoric of the cause without stipulating that practice was the ultimate support for the cause.

Stone (2013) explained aspiring teachers must acquire theoretical and practical knowledge spanning a number of subject areas; chief among these are curriculum development, advocacy, and leadership skills. Teaching sessions on educational theory gives future teachers instructional experiences with young learners in a supportive classroom-like environment under the supervision of education faculty and staff, whose

orientation is primarily public school education (Chai & Merry, 2006). Novice teachers try out ideas and confirm their career choice in education. This allows for a strong foundation in education and teaching, which leads to enhanced practice with a desired outcome of a mastery level of teaching.

Hong et al. (2011) suggested that it is important to consider teachers' epistemological views since such views will impact classroom performance. The principles represent essential concepts underlying knowledge-building as a theory of knowing, and as a way to transform traditional teaching practice (Chai et al., 2006). In order to help prospective teachers develop a more informed view of knowledge-building theory and practice, instead of employing traditional direct teaching, engage the participants in self-initiated and self-directed knowledge work in a knowledge-building environment (Kaplan, 2012).

The traditional educational concept basically sees learning as an activity directed towards enhancing personal knowledge, whereas knowledge-building is a self-directed, idea-centered, and collaborative process. Its chief aim is a continually improving idea representing theory as community knowledge, and practice as the means to experience (Denby, 2010). Justifiably the theories behind the skill is important but in order to better prepare the graduate to operate effectively within the industry of their choosing the readiness in actually performing the skill is equally important (Conley et al., 2012).

Career Preparation vs. Career Readiness

The ultimate goal of any mentor, facilitator, or teacher is to have those they guide become the practitioner of what they teach (Houchens & Keedy, 2009). In order for this to transpire knowledge needs to pass from educator to learner. This knowledge

transfer needs to be orderly, understood, and be able to be retained by the learner. Because some would condemn experiential education as lacking rigor, it has become critical to provide theory-backed models and principles as a foundation for the education (Robinson, Josien, & McGovern, 2011). Furthermore, the application of skills in education will become more relevant, and effective, by helping students become more innovative. It will also be rigorous, because an understanding of why and how education and experience influence innovative propensities, and more effective because of an understanding of how to structure activities to influence the desired outcomes (Houchens & Keedy, 2009).

The process for this type of education is threefold and leads from to the other. Theory, to practice, and on to experiential is the roadmap for success of today's students. Hong et al. (2011) explained the ideas and theories created by knowledge workers such as scientists, engineers, and architects are among the intangible artifacts. These theories and ideas, once created, take on a life of their own, in that they can be improved and converted by people who interact with them (Middlehurst, 2008). In other words, once the theory is taught and explained, the student is on the road to innovation and development. Education should be about more than simply new skills or guiding on how to do things different. Instead, if training is seen as an ongoing process with set goals and outcomes, which are monitored, refreshed, and enhanced, it can bring a continued and long-term benefit to a business or organization (Denby, 2010).

Knowledge building comes from the three-step approach mentioned earlier; it takes the student from theory, to practice, to experiential (Hong et al., 2011). A solid foundation in a specific subject is one, in which the student can take a learned theory, and

apply it in a practical situation. The student has to learn theories in order to apply them in the actual context. Hence, expertise is achieved through a solid theoretical and experiential foundation, and the stronger this foundation is, the broader the expertise will become (DuFour et al., 2006).

Some believe it is the responsibility of the academic institution to help ensure that graduates have the skills and knowledge relevance to employment in the field of aviation safety (Houchens & Keedy, 2009). The university establishment is normally looked upon as the foremost institution when it comes to education and as such has the responsibility to prepare their students appropriately and professionally for this specialized industry (Middlehurst, 2008). The aviation safety field is not a field intended for the theoretical but instead is one for the practitioner.

Hays (2012) stated organizations that operate complex and hazardous technology in order to make products or provide services face special challenges. The aviation and aerospace industries activities have the potential to cause significant numbers of incidents or accidents if things go wrong, so they need to operate conservatively (Adler et al., 2012). On the other hand, the aviation industry also faces normal commercial pressures to reduce costs while maximizing profits (Elian et al., 2013).

Achieving the appropriate balance between cost and profit requires a multi-faceted approach from educators, operating organizations and regulators that address design, engineering, maintenance, and operations (Elian et al., 2013). The safety curriculum of postsecondary institutions require input and evaluation from industry to aid the university in providing the most adaptable, innovative, and most prepared professional to serve in a most vital arena.

Summary

Creating and implementing an aviation safety program has a direct impact on the day-to-day function and financial well-being of the organization (Bjornsen, et al., 2012). To properly assess the rules, regulations, and procedures, it is vital to have someone properly trained for this undertaking. The aviation/aerospace industry is a dynamic environment wrought with both risk and change. Thus, career preparedness is vital (Atak et al., 2011).

Traveling on an aircraft implies a certain amount of risk taking, including financial risk, social risk, and psychological risk. Unlike most other services, air travel also exposes passengers to physical risk. Consumers will accept only what they deem an acceptable risk, and it is the reputation of the company that goes far in the consumer assuming this risk (Elian et al., 2013).

The only way to avoid both incidents and accidents before they have the chance of occurring is to accurately detect risk areas and work to reduce them proactively (Darr et al., 2010). Innovation of the safety system must be done with cooperation with industry partnerships. The leaders in the aviation and aerospace industry are experts in the skills required for their personnel while the academic institutions are the expert at education and developing higher order thinking skills and the theories associated with such (Green et al., 2012). Graduates need the skills and certifications that firms require as well as the education and learning skills of the academic institution in order to become productive within their chosen field (Joseph et al., 2010). The preparation, development, and readiness to perform and to be career ready and operate within the needs and requirements of any industry are a basic purpose of the university system

Chapter 3: Research Method

The teaching of theoretical information by postsecondary academic safety programs has resulted in a lack of preparedness of postsecondary graduates; this has prevented aviation safety managers from having a dependable pool of reliably trained and prepared safety professionals to select from. The single case study provided a research method for exploring the relevance and sustainability of postsecondary academic safety programs. The purpose of this qualitative research was to gain insight regarding the current needs and requirements of the aviation/aerospace industry through a case study analysis. Focusing on the design logic underpinning case studies, Stake (1995) provided a two-part definition for a case study. The first part of the definition emphasized its scope and the second includes other technical characteristics. A case study is an empirical inquiry that investigates both people and programs, in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. This method is best used to research the questions of; what are the perceptions of industry safety professionals in aircraft and airport safety management on the academic training of safety professionals in the United States? The safety program needs and requirements within the aviation and aerospace industry by its own characterization is program based. When that industry program is added to the postsecondary academic program tasked with the career preparation of people, thus it may lend itself to review through case study.

Research Methods and Design

This study used a qualitative case study design and interviews of aviation and aerospace industry safety professionals to examine the needs and requirements of the

aviation and aerospace industry safety programs, to examine the relevance and consistency of postsecondary academic safety programs. Case study research offers a broad array of prospective philosophical positions that underlie the qualitative research design and approaches for its design (Stake, 2010). Those broad positions explain a basic belief system or choices such as single case study and safety personnel experience.

Case study. A case study was best method to answer the perceptions of industry professionals in safety management on the training of safety professionals and the movement of aircraft, ground vehicles, and people. A qualitative case study inquiry addresses the technically distinctive situation in which there may be more informational areas of interest than actual data points (Hatch, 2002). Case studies typically utilize different methods for collecting data, including interviews, documentation, archival records, participant observations, and direct observations (Hatch, 2002). The current research study was bounded by the review of literature and the definition of the research question. The boundaries established serve to improve information overload, a common occurrence with the case study method (Stake, 2010).

Participant experience. The needs and requirements of the aviation and aerospace industry question are inextricably linked to the epistemological question, which maintained an objective in relation to the phenomena being studied (Hatch, 2002). The phenomena being studied subscribed to a relativist construct for reality; the approach to the epistemological question is by default subjectivist. With this approach, knowledge is viewed as being created through interaction between the researcher and his or her subjects (Hatch 2002). In other words, the people managing the safety needs and

requirements of the aviation and aerospace industry were interviewed as the subject experts and participants of this study.

Population

The population involved in this case study was adult aviation and aerospace safety professionals of organizations selected within the aviation and aerospace industry. These safety professionals were purposefully selected (Hatch, 2002) based upon their experience level, accomplished training, and seniority in safety management and their possessing knowledge of the needs and requirements of the aviation and aerospace industry. Junior safety professionals new to the aviation and aerospace industry and lacking an acceptable level of experience were excluded. The population of postsecondary academic institutions involved in this case study were institutions that currently offer academic programs within the field of aviation and aerospace safety.

Sample

Sampling was addressed both for the interviews and the academic document reviews. Two different samples were utilized for this research study based upon the conducting of interviews and the academic document review. Through the interviewing of experienced professionals and the review of academic program documents, a clear picture developed and assisted in answering the research question. The sample was chosen purposefully from the population made up of participants that shared common characteristics through passive recruitment via LinkedIn (Hatch, 2002). Purposefully chosen participants were contacted through LinkedIn as shown in Appendix C, LinkedIn Interview Participation Request and were sent the Informed Consent Form, as shown in Appendix D; both were intended for passive recruitment and an explanation of the study.

For interviewing of adult aviation and aerospace industry safety professionals the sample size of aviation and aerospace industry safety professionals was limited to 55 professionals of either gender, with this limit being set for several reasons (Hatch, 2002). First, the sample of more experienced aviation and aerospace industry safety personnel is small; these aviation and aerospace industry organizations generally have a few key industry representatives serving within safety positions of the organization. Second, the nature of the aviation and aerospace industry, and the positions that the industry representatives hold, limits the amount of time they will have available to participate in a study such as this. Finally, based on extensive experience with these types of organizations, a larger sample size was not needed because of saturation and possible redundancy of results (Hatch, 2002). The participation rate provided the confidence that the views of all parties were adequately represented and that the research participants were knowledgeable concerning the question under study.

Materials/Instruments

I used a qualitative case study design and interviews and academic document reviews. Interviews of aviation and aerospace industry safety professionals were conducted to examine the needs and requirements of the aviation and aerospace industry safety program. I completed interviews of aviation and aerospace safety industry professionals by using the Interview Protocol, as shown in Appendix B, to help answer the question of what are the perceptions of industry professionals in safety management on the training of safety professionals and the movement of aircraft, ground vehicles and people (Stake, 2010). Through the use of nonsensitive and noncontroversial open-ended questions, and tapping into the experience of the aviation and aerospace safety

professional, a logical answer concerning the needs and requirements of the aviation and aerospace industry's safety program emerged. Stake (2010) defined open-ended interviews as interviews that maintain flexibility and rapport with the interviews by active listening. Nondeceptive, noncoercive, open interviews were used so that interviewees were given more opportunity to speak freely and perhaps more candidly and honestly, while explaining their unique perspectives on issues at hand (Hatch, 2002). Interviews were an important and justified means of collecting data in this study because candid and honest answers illuminate leadership dispositions and philosophies on promoting, cultivating, and encouraging a technological culture (Stake, 2010). The interview helped provide insight into what is of utmost importance for the aviation and aerospace safety program. Interview questions were derived from the literature review, and are shown in Appendix A. The questions were first reviewed by experts serving within the aviation and aerospace industry to help confirm the validity of the questions, as explained in Appendix A.

The same questions were asked of all participants and were designed to draw out thoughtful and meaningful answers that revealed if graduates are prepared and either successful or in need of improvement when it came to the aviation and aerospace safety professional (Stake, 2010). The questions were intended to extract information and responses that elicited depth, detail, vividness, nuance, and richness by creating three kinds of questions, main, follow-up, and probing (Stake, 2010). A mixture of main, follow-up, and probing questions ensured that the responses gave insight into the reasons why initiatives are adopted and why specific decisions are made.

Data Collection

Data sources included documentation and focused interviews of industry members of the case study industry (Hatch, 2002. A primary strength of the case study method is in collecting information from numerous sources (Stake, 1995). All information will be kept in a secure file for 7 years, at which time it will be destroyed by the means of crosscut shredding.

Interviews. Purposefully chosen participants were contacted through LinkedIn, as shown in Appendix C, and sent the Informed Consent Form, as shown in Appendix D, intended for both passive recruitment and an explanation of the study. The first 55 participants who initiated contact were interviewed using the Interview Protocol, as shown in Appendix B (Hatch, 2002). Interviews were conducted in-person, with local interviews being completed at the nearest public library, or via electronic means involving Skype. Additionally, interviews were conducted on personal time outside of business hours to solicit responses in a relaxed environment, and took one hour to an hour and a half in time in order to elicit rich information (Stake, 2010). Times were scheduled around the participants' availability to assist with maximum participation. Interviews were digitally recorded and anonymously transcribed; no video recording took place. After transcription the digital recordings and the transcriptions will be retained for 7 years in a secure file. After the 7 years all digital recordings and transcriptions will be destroyed by means of a crosscut shredder. The names of participants were kept confidential during the data-gathering process.

Processing and Analysis

Another approach associated with the data collection phase that increases construct validity is the chain of evidence (Yin, 2009). Yin (2009) noted the chain of evidence allows the person whom reads the case study to follow the origin of evidence, from initial research questions to ultimate case study conclusions. Furthermore, original evidence should not be disregarded through inattentiveness or bias and fail to receive proper consideration.

Interviews. To maintain a chain of evidence, the initial research questions were linked to the case study protocol and the case study protocol to data collection methods. The actual information collected must be linked to specific evidence contained with the case study database, and evidence provided in the case study database should be properly cited in the dissertation (Stake, 1995). Doing so helps ensure relevance of the case study, to not stray for the intent of the case study, and addresses reliability issues typically associated with the data collection phase of the case study method. Stake (1995) suggested developing a case study protocol and a case study database. The protocol contained a number of important pieces of information to guide the study, including an introduction to the case study, document review procedures, and interview questions.

The pieces of information collected were broken into categories based upon predetermined typologies and reviewed for any possible relationship (Hatch, 2002). Additionally, as patterns immerged, considerations through inductive analysis were used for better understanding by finding any possible connections of the information being reviewed (Hatch, 2002).

Interviews were characterized by inductive rather than deductive information, just as all qualitative research is characterized (Hatch, 2002). Interview transcriptions were read and coded based upon similar themes that were uncovered. Coding represented educational or experiential requirements, as well as possible certification or qualification needs being sought by aviation and aerospace safety managers. The related information was placed within a domain, with each domain being reviewed for possible themes across domains. Information was entered into a master outline in order to express themes among domains (Hatch, 2002).

A systematic review and coding of the transcripts helped allow for themes to appear (Hatch, 2002). Sections of interview text was coded and supported an analysis of interview segments on a particular theme, the documentation of relationships between themes, and the identification of the needs and requirements of the aviation and aerospace industry that were important to the interview participants. Similarities and differences across sub-groups, such as training and experience were also explored (Hatch, 2002). As new codes emerged the coding frame was changed or updated and the transcripts were reread according to the new structure. This process was used to develop the categories, which was then conceptualized into broad themes after review. Each category was labeled and described, to include characteristics, and needs and requirements. Additionally, any links among the categories were annotated within the master outline as well. Links were based on commonalities in meanings between categories or causal relationships, such as certifications and experience, or qualifications and training (Hatch, 2002).

Assumptions

Selecting the most appropriate aviation and aerospace industry safety program leadership and compiling the most logical and relevant interview questions assumed the validity of the research. Guidry (2012) stated that in the late 1980s and early1990s, the disconnection between the skill set of the emerging and incumbent workforce and the requirements of the workplace came into focus as employers increasingly questioned the readiness of their job applicants. This question of readiness no longer exists. Through the interviewing of aviation and aerospace industry leadership that were serving in capacities of safety, and utilizing case study research regarding postsecondary aviation safety programs I had an assumption of honesty and relevance (Hatch, 2002). I also assumed that aviation and aerospace safety leaders would help ensure the validity and relevance of the research because they ultimately would have the most to gain with the possibility of better career prepared professionals.

Participant Considerations

There was minimal risk to the participants of this study because the data being sought posed little or no risk to personal or professional activities (Creswell, 2009). Purposefully chosen participants were contacted through LinkedIn, as shown in Appendix C, and sent the Informed Consent Form, as shown in Appendix D, intended for both passive recruitment and an explanation of the study. Signature of the Informed Consent Form took place upon receipt, prior to any interview being conducted, and was accomplished through electronic means. Participants were adults of both genders working within the aviation and aerospace industry and not subject to participation of any minors. Prior to the interview, and during the passive recruitment, a full disclosure of the

study was made to the participant, including the expectations of participation and expectation of participant anonymity. Additionally, an offering regarding the participants' an opportunity to examine the aggregate findings upon completion of the study was made. Responses were held in confidence and in no way could threaten the employment relationship of respondents. The overarching study of the perceptions of industry safety professionals in aircraft and airport safety management on the academic training of safety professionals in the United States, may be able to help the trainers better prepare the safety program graduates to work in the aviation and aerospace industry. A better trained and consistently educated safety professional may be career ready and better able to function within the aviation and aerospace industry.

Summary

It is the responsibility of the institution to help ensure that graduates have the skills and knowledge relevance to employment in the field of aviation safety. The university establishment has been looked upon as the foremost training method when it comes to aviation and aerospace education and as such has the responsibility to prepare their students appropriately and professionally for this specialized industry. The aviation safety field is not theoretical but practical. Hayes (2012) stated organizations that operate complex and hazardous technology in order to make products or provide services face special challenges. The aviation and aerospace industries activities may cause significant numbers of deaths and injuries if things go wrong, so its practitioners need to operate conservatively. On the other hand, the aviation industry also faces normal commercial pressures to reduce costs and maximize production.

Achieving the appropriate balance between cost and production requires a multifaceted approach from educators, operating organizations and regulators that address design, engineering, maintenance, and operations. The safety curricula of postsecondary institutions need to be consistent but ready to adapt to industry changes, innovative, and capable of preparing professionals to serve in a vital arena of aviation.

Chapter 4: Findings

The purpose for conducting this qualitative case study was to gain insight regarding the current needs and requirements of the aviation/aerospace industry. The outcome of the study produced information that explains many of the views held by safety management professionals serving within the aviation/aerospace industry. The research question driving this study was: What are the perceptions of industry safety professionals in aircraft and airport safety management on the academic training of safety professionals in the United States? Answers to this basic question revealed the categories that have been grouped to form the discussion themes. These themes are presented as discussion categories in both the results and evaluation sections of this chapter. In the results section, themes are organized around the research question associated with the study so as to answer the question in a complete and organized manner. Chapter contents are concluded in a brief chapter summary.

Interviews

I sent 67 Interview Participation Requests, as shown in Appendix C, via LinkedIn's individual professional contacts lists. After reviewing the 60 acceptance replies, I interviewed the first 55 professionals that could schedule interviews within their busy schedules. The 55 safety management professionals provided information through an interview, where questions were put forth in a structured, open-ended manner. A review and separation of information was conducted from 67 transcribed pages of interview information, the most relevant of which are presented in this chapter. An example of participant demographic information is found in Table 1, along with the

following example of participant biographical information, to provide a clear perspective of participant qualifications. Listed participant names are pseudonyms.

Alan Scott. The Aviation Safety Chair for a major aviation association, he directs the efforts of the volunteer safety structure for its 52,000 members at 32 U.S. and Canadian airlines. Additionally, oversees safety work in aircraft design and operations, airport ground environment, air traffic services, accident analysis and prevention, human factors and training, and environment. Previously, was Chairman for an association's Human Factors and Training Group where he led the effort to establish policy regarding Crew Resource Management and Threat and Error Management (CRM/TEM) training, the Advanced Qualification Program (AQP), and international licensing initiatives. He began his professional airline career in 1977 within the commuter airlines industry.

Hal Jordan. He has served over 16 years in the aviation industry. Works primarily in airport management, and currently is a certified member of the American Association of Airport Executives. The Airport Director for one of the largest general aviation airports in the western United States.

Guy Gardner. A retired airline captain that was involved in transport category airline as a pilot for nearly 20 years, flown almost 18,000 hours of flight time, and that was all in the capacity of a line pilot. Safety background is involved directly with that flight experience as well as courses in safety as an undergraduate, graduate, and now post graduate as well.

John Stewart. He started as an air traffic controller in 1975, and spent 8 years in the Air Force. He held the rank of staff sergeant, and participated in accident investigation and air traffic control. In 1983 left the Air Force for employment with the

Federal Aviation Administration (FAA). He spent his FAA career working air traffic control in the eastern United States, with air traffic control tower approach; also worked at one of the largest airports in the United States at the approach air tower. He retired in 2007 and became a liaison for FAA air traffic requirements and Safety Director for equipment. After retirement he became the director of safety and technology of air traffic control. Under his department were an active safety committee and the air traffic safety program. He was additionally placed in charge of air traffic accident investigators working for the NTSB.

Kyle Rayner. He graduated from an aviation university, and interned with an airline in both the training and safety departments. After graduation, continued his internship for about a year until being hired as a full time safety investigator. During the time at the internship he was given the role of assisting safety investigators. His responsibilities increased all the way to overseeing accident investigations until the end of the internship. He has been at this current position as an accident investigator for two years now and has overseen 50 accident investigations looking into takeoff, inflight and ground operations related incidents. He worked as the coordinator with the National Transportation Safety Board (NTSB), and is on the accident investigation team for the airlines go team. Additionally, he also has taken on responsibilities as the response coordinator and investigation response coordinator for the airlines. Currently, he is enrolled in the Master's program at a university in London doing graduate work on human factors and safety assessment.

Simon Baz. He have six years in the aviation industry, and completed pilot training at a university in the western United States, while completing his bachelor's

degree in aeronautics with a minor in aviation safety. He has now been a certified flight instructor for four years. Currently, he is serving as a safety director for a large aviation safety organization.

Daniel Young. Worked in aviation for the past 25 years, and gained much of his experience through the United States Navy flying as a naval ordnance man on P-3 Orion aircraft. Additionally, he functioned in the maintenance department as an airframe and power plant licensed mechanic, and within the operations department as an aviation safety specialist. He gained quite a bit of his experience working as a squadron safety manager up until his retirement. At that time he moved into his current career as a safety analyst for the FAA.

Abin Sur. He went to Naval aviation schools while I was serving in the Marine Corps, and worked as an aircraft mechanic in various Marine squadrons from 1967 through 1970. After his discharge in 1973, he's been an airport manager in general aviation airports, and I've been an airport manager per se since 1981 at general aviation airports as well as an operations manager at a large international airport. Currently, he's the airport administrator for a general aviation airport in the southwestern United States.

Anya Savenlovich. A retired Air National Guard pilot. His aviation background started in 1979 with the military, and from there went to a major airline and worked as a flight crew-training instructor. He moved to another airline and developed their airbus training, while also serving part time as an airbus captain for a flight academy. He develops courseware for flight safety services, and is currently an unmanned aerial vehicle course developer and instructor for a large aircraft manufacturer.

Waverly Sayre. She studied communications as her major in college, with homeland security and international relations being the two areas of focus. As soon as she finished her degree she immediately went into a Master's program—Masters in aeronautical science with a focus on systems safety. She took a semester off for an internship with the State Department, and moved to Germany and worked in their political section for aviation. Upon return, she finished her Master's and wrote her capstone on safety management. She then went to work for the International Civil Aviation Organization (ICAO), working in their air navigation bureau specializing in SMS implementation. She has been with the airlines for three years doing safety management for the last two.

Jong Li. He was on active duty in the Navy for 23 years and during that career had the opportunity to attend the Naval Post-Graduate School twice; once for the Safety Officer Course and then when he had the privilege of being placed in charge of an aviation squadron, he then attended the Safety Leadership Course. Academically that is his background in safety; operationally he performed in a safety role as a ground safety officer and an aviation safety officer. During that 23-year career he not only learned about safety but had the opportunity to execute what he learned from a program level, and then manage it from an executive level. After his Naval career he was asked to head an organization that provides safety management support to business aviation flight operations. He provides both material and information support on a variety of areas that manage risks in a flight operation through a program that he designed.

Barry Allen. He spent 24 years in the Air Force as an aircraft hydraulics technician on multiple aircraft, and was the systems evaluator on the B-2 bomber. When

he finished with those jobs he moved over to the position of flight safety superintendent for the Air Force Flight Test Center where he had maintenance oversight for all aircraft development programs. He retired from the Air Force and as an Airframe & Powerplant (A&P) mechanic, moved into a position with an airline training academy. Currently, he works for a large metropolitan city's aviation department where he is the air side training coordinator for all Federal Aviation Regulations Part 139, which is the certification of airports. He is also the certification trainer for all air side operations personnel for a large international airport.

Lia Nelson. She started with the airline industry in operations, by marshalling aircraft. After several years she created and owned her own company training personnel in safety and airport security, including all FAA and TSA requirements. Partnering two of her companies with Airports Council International (ACI), she conducts training for airport safety personnel around the world.

Wally West. His first job was as the director of maintenance, and director of technical services for an air ambulance corporation, which is now among the largest helicopter company's in the world that does emergence medical services (EMS). He left that company, moved over to the FAA and was there for 17 years. He started out as an aviation safety inspector and became a senior process developer for international aviation. He wrote procedures and testing procedures for the FAA safety programs for all of the airlines including private aviation.

Jay Garrick. He has 22 years working as an aircraft maintenance technician in the United States Air Force. Safety was a daily occurrence because he had the lives of the pilots and crew in his hands. Once he retired his role into the civilian world was as a

systems engineer with an aerospace manufacturing company specializing in human factors. He works specifically with mishaps and human error occurrences with the goal of preventing both.

Table 1

Participants Experience (first 15 participants for example purposes)

Pseudonym	Safety Management Role	Years of experience
Alan Scott	Aviation Safety Chairman	>30
Hal Jordan	Airport Director	>15
Guy Gardner	Airline Captain	>20
John Stewart	Air Traffic Controller	>30
Kyle Rayner	Response Coordinator	>10
Simon Baz	Flight Instructor	>5
Daniel Young	Safety Analyst	>25
Abin Sur	Airport Administrator	>40
Anya Savenlovich	Safety Course Developer	>25
Waverly Sayre	Safety Manager	>5
Jong Li	Vice President in Charge of Safety	>25
Barry Allen	Airport Training Coordinator	>25
Lia Nelson	Safety Company President	>15
Wally West	Safety Inspector	>15
Jay Garrick	Systems Engineer	>25

Results

This qualitative case study captured the experiences and perspectives of the participants as they relate to safety management and the needs and requirements of the aviation/aerospace industry. The interview questions and structure of the study investigated the perceptions of training effectiveness on the preparedness of the postsecondary graduate regarding aviation safety management.

Interviews. After the completion of the interviews and reviewing the information the most recognizable themes, identified by the interview participants, are shown in Table 3.

Table 2

Interview Themes

Safety Management System (SMS)
Human Factors
Communication Skills
Understanding Culture
Practical Program Knowledge

The importance of safety managers to have a practical understanding of the themes, listed in Table 3, were identified by the majority of the participants through utilization of the interview questions, as shown in Appendix A. By the identification of these themes, and then when reviewing the postsecondary academic programs, relevance of the academic programs and the meeting of the needs and requirements of the aviation and aerospace industry were established.

Safety Management System. The most identifiable theme throughout the interview information by 85% of the participants was the need to have a practical knowledge of the safety management system. This knowledge adopts an organized approach to managing safety, including the necessary organizational structures, accountabilities, policies, and procedures (Yi, 2012). The safety management system (SMS) has grown within the last 10 years from a safety program to a regulatory and certification requirement. Barry Allen felt that the SMS requirement not only impacts an organization, but also the employees at every level within the organization. "Now with SMS just about every task or job or anything that you want to do on an aircraft system or

airport system has some sort of risk involved so it also has an SMS incorporated with it. So to me that specialized training that's important would be heavily involved with the safety management system in general." Wally West also mentioned this fact concerning SMS requirements will not be changing anytime soon. "It's viewed as a certification program or a registration program and that's not the intent of what it started out to be. It wasn't a goal to have it some sort of a compliant program because the federal government can't really do that because what they're trying to do now is come out with minimal standards. And a minimal standard can't be regulated for a safety management system." This is not the first participant to question the implementation of SMS, while understanding the need for a practical understanding of the SMS requirement and assessing risk. Alan Scott explained it as, "SMS is the big one. How to keep it dynamic and build a culture to keep SMS breathing and growing so it does what it was designed to do and not be reactionary. In other words, doing it right. The problem is the FAA hasn't figured out exactly what they want yet. They are tasked with ensuring safety, but yet still need self-reporting professionals and they have an expectation of people doing things the right way." The requirements for an SMS to be implemented policy within organizations and the aviation and aerospace industry, is expected to increase over the next 5-years. This only adds to the importance of a practical knowledge for implementation.

Human Factors. The second most identifiable theme by 80% of the participants was a need to understand human factors. When examining aviation safety most participants addressed the need for a better understanding of the connection that people have within the aviation and aerospace industry (Tuccio, 2011). Daniel Young explained this need as, "When it comes to safety I think one of the elements that a lot of the

graduates should prepare for and have a strong practical knowledge of is human factors, in other words an understanding of people. Human factors I think are one of the most important components of aviation safety. It is from my research and from learning from my experience the majority of all accidents and incidents are attributable to human error." Daniel added, "Studying human factors and having that understanding of people really aids the proactive approach to safety. Not just the mistakes that the human element can make, but also human performance and the reasons behind fatigue and some of the mistakes that some of us as humans make. And this goes for not only flight personnel but also design, manufacturing and maintenance as well. The participants recognized the impact role that human factors plays in the entire industry, with Waverly Sayre even stressing the importance of possibly creating a human factors certification, and maybe tying that certification into an SMS program as well. "Receiving a Human Factors Accident Classification System (HFACS) certification before I left college and having that human factors type classification or certification has really helped me because it shows that I at least have an understanding of the human factor and being able to quantify human error has helped greatly when working with SMS." Jong Li expressed the importance of the need to understanding human factors as well. " The human factors background is important, not just from a cockpit perspective, but understanding what makes people tick so that when you're implementing something that can be influenced by the culture of an organization if you don't understand how personalities affect that, and how different dynamics in an organization affect human behavior and attitudes then you just can't really implement a system approach to safety." Despite advancements in technology, humans are still accountable for ensuring the success or failure, as well as the

safety of the aviation and aerospace industry. Because of that fact safety personnel need to be knowledgeable, flexible, and efficient while performing safety management.

Communication. A consistent theme among the interviews, 79% of the participants felt a need to improve upon the communication skills of academic program graduates. Most professional positions within other industries require a strong grasp of communication and that skill is no less important in the aviation and aerospace industry, Alan Scott agreed with this sentiment. "How to communicate, how to cultivate a culture of safety and then serve as a mediator as well, has become increasingly important. I never want to use the term politics when talking about safety and maybe bureaucracy is a better term, but to understand how to get things done such as budgets and programs within a bureaucratically filled environment has become very important. In other words; being diplomatic." Anya Savenlovich expressed this need as, "The other big one we go through is the ability to maintain confidentiality and the ability to communicate findings. So in other words, whatever's uncovered is communicated effectively and through the proper channel. It goes back to that trust I mentioned, so that a pilot will know what they've communicated has not only been interpreted correctly, but also to the right people. So, one of the skills that really need improvement is that effective communication." Communication is the ability to effectively pass on information, but there is the element of communication that helps with effectively working with other personalities, such as what Waverly Sayre mentioned. "Dealing with so many types of people and understanding conflict resolution was something that was never mentioned in any of my programs." Wally West summed this up as, "What seems to be the piece that's missing mostly in management for safety professionals is having the ability to

communicate, and showing the profit value added for safety." To assist decision makers in arriving at the best possible decision from many possible alternatives, accurate information is needed. This is the important aspect of communication, and requires the attention of safety management so as to help establish and implement the best methods of lessening communication problems.

Understanding Culture. Communication is a strong piece to effective management of safety, as expressed by 75% of the participants, but culture can have a large impact on the communication piece of management. Culture may be identified as a national culture, regulatory culture, or even that of an organizational culture. With respect to the organizational culture, Hal Jordan described this as, "As the airline grew there was always that underlying culture of we're going to get it done because we have to get it done." That type of cultural expectation of get the job done regardless of the risk does not necessarily mean a safe operation. Waverly Sayre described the need for cultural understanding even further. "I wish the university I attended would have taught me more things that I could have actually utilized like what I would have to do during a merger, especially when it comes to organizational culture and trying to bring two different organizations together. Regarding culture, how you actually maintain a safety culture. I mean in college, the professors always taught culture and it's always mentioned, but nobody ever gives us a way to actually manage the culture and build it. And that is actually one of the most important things we have to do because it's tough to build and yet can be easily be taken down, and the worse thing to do during the middle of an airline merger is ignore it. And in safety I've managed the pilots, the dispatchers and the mechanics, which can be tough dealing with just those three entities, but now during a

merger you double everything because you have conflicting cultures coming together that you have to somehow merge. And in every subsection I can see differences in their safety culture because half the pilots may be doing things one way the other half have a conflicting way of doing things because it's a different organization, and I have to somehow bring them all together under one umbrella so to speak." The participants were consistent regarding the importance of understanding culture, and Wally West summed up the regulatory role. "You can't regulate a cultural understanding, but you can teach the skills necessary to help."

Practical Program Knowledge. Seventy-two percent (72%) of participants were overwhelmingly in support of more practical knowledge being taught, instead of the theoretical knowledge that most college programs seem to endorse. Kyle Rayner explains this as a need to understand the overall safety program parameters and not just the accident investigation aspect. "I definitely see that in that a safety department isn't just safety investigations. We have audits, evaluations, ground safety, and health safety. The department consists of a lot of different areas and has a lot of employees at various levels. Most of the safety department personnel we have are interested in safety, but I wouldn't say most got into it at the beginning because they were really interested in safety, that's something that's grown over time. The problem is most people look at aviation safety only thinks of accident investigation, and not the overall program that some would consider mundane office work rather than the fieldwork that holds more glamour. There are many evaluations and audits and FAA rules and policies that need to be acted upon. Although it may appear to be less glamorous, it is really important, but I don't think that message is communicated to people that are in college." Alan Scott

supported this simply as, “Teach the practitioner of the program and also the hands-on skills required to accomplish the job. We need people that know what the job is, and how to accomplish it.” This is not to say that there does not need to be some theory taught as a foundation for preparation of a college graduate, but the practicality of training is becoming more important, as Hal Jordan suggested. “Today we need graduates ready to work; we’re not seeing it though. It’s still the old standby of theory and no practicality. In fact graduates aren’t able to refocus, change and adapt in the working environment; all of which we need them to be capable of.” Abin Sur described this as “looking back at my courses that I was taught based on what the teacher thought was important and not necessarily what I needed to know to work and what the industry thought was important. In other words, the academic program wasn’t so in touch with the realities of the industry. And I definitely think it’s way too theoretical and less practical. I think while I had a theoretical knowledge, and that can be useful, but I think most of the things I learned came from my internships and not from school. There was a lot more un-learning of the theoretical knowledge and I had to learn the practical requirements of what my job entailed while actually on- the- job.” This practical knowledge the participants refer to is a need to understand safety management, as it pertains to its many facets. Simon Baz related training as “try to make sure it’s based on the practical application so they come out ready because in reality the theory they can read on their own.” Practical knowledge is useful to both the organization as well as the safety personnel because of better work performance through a stronger foundation of work skills. It also allows the employee to cope with work pressure through a better understanding of the job requirements.

Evaluation of Findings

Every participant interviewed in this study demonstrated a degree of comprehension regarding the needs and requirements of the aviation and aerospace industry, with regards to safety management. Furthermore, almost every participant defined the same needs, as shown in Figure 1, and stressed the importance of practical knowledge, and not just hypothetical theories. Participants generally expressed a high level of understanding and an impressive level of experience. During the interviews a common understanding was arrived upon; postsecondary academic programs are not sufficiently preparing safety managers, but instead practical hands on certificate programs and internships are doing so. Kyle Rayner stated this best, "I think most of the things I learned came from my internships and not from school. There was a lot more un-learning of the theoretical knowledge and I had to learn the practical on the job. It was not a way that I thought I would have to go through for my career if that makes sense." Lia Nelson added, "Anytime you can get a student an internship to see at least one perspective of how a business or a company operates with safety, they will walk away having seen it [safety] in action."

Overall there is a perceived lack of graduate preparation on the part of the academic institutions by the participants, and an overwhelming viewpoint that academic programs are not as in-depth as they need them to be. This is not to say that the aviation and aerospace industry is not complicit in the design of the programs. Wally West expressed the view that "a professional cannot manage safety as one would manage operations, because in safety you do not know you have failed until something goes wrong. That being said you can in fact manage risk, and until the aviation and aerospace

industry accept that safety management is a profit venture the postsecondary academic institutions will not be requested to expand the program offerings. That seems to be the piece that's missing mostly in safety, professionals having the ability to communicate and showing the value added for safety."

Summary

The purpose for conducting this qualitative case study was to gain insight regarding the differences of the top aviation/aerospace academic programs along with the current needs and requirements of the aviation/aerospace industry. Interviews were conducted to obtain study information and biographical information on study participants. An example of participant background information was included in this chapter and was presented in table form. Research was conducted to acquire information sufficient to answer the basic research question associated with the study was conducted through interviews, which were reiterated in this chapter and formed the basis for discussion. In addition to the presentation of relevant findings that quote directly from interview discussions, the bulk of Chapter 4 was dedicated to the assessment of those findings. Results from the study were organized, analyzed, and evaluated around five major needs and requirements derived from the interviews. The analysis of findings thoroughly answered the overarching question and is summarized here.

Programs of study and the practical knowledge put forth play a large role in graduate preparedness. Experiences derived from early career exposure to military training are highly influential in terms of safety management; so too are the cultural experiences that come of one's affiliation with various organizations. Partnerships and industry advisory panels have an important function in helping to ensure the relevance of

postsecondary academic programs and the meeting the needs and requirements of an industry. Finally, the promotion of industry internships by the aviation and aerospace industry itself can too aid in the development of graduates and their being better prepared to serve.

The nature of the area within the aviation and aerospace industry is influential contextual factor in determining the need and requirements. The fact that safety management positions may be assumed by professionals based solely off of a pilot qualification and not specific training in the area is cause for concern. Affirmed emphasis in relevant aviation safety courses of study, or relevant certificate programs need to be undertaken to help ensure qualified and ready professionals are in place.

Chapter 5: Implications, Recommendations, and Conclusions

The specific research problem associated with this study was the inconsistency among academic safety programs has resulted in a lack of reliably trained and prepared safety professionals in the aviation industry. The purpose of this qualitative research was to gain insight regarding the differences of the top aviation/aerospace academic programs along with the current needs and requirements of the aviation/aerospace. A case study design was used as the research means in a qualitative study about postsecondary academic safety programs and the needs and requirements of the aviation and aerospace industry. Participant interviews constituted the core of data collection efforts and provided the information that was sought after regarding the needs and the requirements of the aviation and aerospace industry.

The only potential limitation in this study was the possibility that one or more passively recruited participants would not speak openly with regards to the industry needs and their views on program graduates readiness in filling management positions. Absent an effective modification plan, such a limitation would have frustrated the purpose of the study if it were in fact encountered; however, no such limitation occurred. Furthermore, every participant interviewed for the study had a vast area of expertise and were both gracious and open during the interviews. No major ethical challenges were presented in the course of this study. Each interview participant was afforded an opportunity to give informed consent for their participation in the study, which included an understanding that confidentiality would be strictly maintained and that no harm would befall them. Furthermore, no deception or coercion of any kind was employed against participants at

any stage in the course of the study. I was completely open with study participants and revealed the purpose of the study at the beginning of each interview.

A major thrust of this chapter is a discussion regarding the implications associated with the research reported. One of the purposes of this chapter is to address the implications of these inferences. Findings of this nature are explained in full and articulated logically while other distinctive features are revealed and clarified. At the same time, any perceived theoretical conflicts are addressed and new knowledge is presented for consideration. Also presented in Chapter 5 are meaningful recommendations for the application of findings, along with suggestions for additional research related to the subject.

Implications

The overarching research question of this study was; what are the perceptions of industry safety professionals in aircraft and airport safety management on the academic training of safety professionals in the United States? Study findings provided ample material for a thorough and direct answer for this question. At the same time, important inferences and logical conclusions may also be drawn from the outcome of the study and are also presented for review.

Research from this study suggests that the perceptions of industry safety professionals, on the academic training of safety professionals in the United States, is lacking. The interview information indicated that graduates are not adequately prepared for a practical approach to safety management, and that job skills are learned after a graduate is hired, and not in a postsecondary academic program. Additionally, the need

for internships as a way of learning practical job skills became evident during the interview process.

Inasmuch as industry requirements and organizational purpose were identified in this study as major determinants of a postsecondary academic program's desirability, a lacking of needed courses became evident. This demonstrates that a well-trained and ready to perform graduate will not be available via the training through a postsecondary program. Instead industry organizations would be better served to look to someone with minimal experience, and at a later date have the employee attend a certificate program. By having employees attend certificate programs, instead of looking to hire postsecondary academic program graduates, there stands a better chance of having safety personnel trained for specific job needs that the organization may require.

Recommendations

The result of this study is believed to represent an important contribution to the ongoing preparation of safety management in the aviation and aerospace industry. The teaching of practical application of knowledge within a postsecondary academic institution, vice purely hypothetical knowledge can lead to a better prepared graduate to serve in the workforce (Kaplan 2012). Though aspects of this study may be applicable to all aviation and aerospace organizations, some results might also be appropriate for non-aviation entities, particularly those that have organizational elements in common with those of a technical or risky profession. Industries that require risk assessment as part of the organizational culture could benefit as well from this study to help ensure a well-prepared employee.

Practical Applications. Knowledge obtained from this study may be appropriately assigned to any number of required workforce skills, in any number of industries. The postsecondary academic institution's obligation to prepare a graduate for employment is not singular to the aviation and aerospace industry. In fact this can be translated to any number of fields, for example the training of teachers in the educational field or the training of doctors within the medicine field. The suggestion that industry and academic institutions need to work in partnership for the benefit of not only the student, but also the academic institution and organization is well founded (Byers, 2012).

Perhaps more than anything, knowledge obtained from this study has the potential to help aviation and aerospace organizations realize that postsecondary graduates are not always prepared. The aviation safety field is not a field intended for only theoretical knowledge, but instead is one to employ a practicality of knowledge. Also that investment in internships and that an outreach program with academic institutions may be of benefit. Knowledge gained from this study also has the potential to help bolster graduates in overcoming what the data from this study suggests is an unpreparedness to serve in safety management.

Future Research. Additional research related to the problem and purpose of this study is recommended. One recommendation for future research centers on a mixed methods study that would be designed specifically to measure and compare the use of academically trained safety professionals with those that are serving in safety management roles as second careers. One purpose for the recommended research would be to obtain information that directly compares the performance of a safety manager that was academically trained to that of a safety manager that relies on some aspect of

aviation experience, such as being a pilot. The research may assist the aviation and aerospace industry with recognizing the better qualification pathway. This information could provide industry leaders with knowledge that might help them shape safety management qualifications in more calculated ways.

Sampling participants might include mechanics, pilots, and military veterans. Research subjects could also be affiliated by organization and mission experiences. All of this should be considered in light of preference for a certification or qualification. Quantifiable data should be produced that speaks directly to the role of education and experience in relation to propensity toward hiring safety management professionals, while controlling for context. It would be useful to identify and include all relevant contextual elements as evaluation criteria.

Conclusions

Through the utilization of information gained from participant interviews, a basis of graduate preparedness could be formed. That although a base level of theory is always needed, it is the practical or applied education that truly prepares a graduate for their desired career. That being said, the most economical and realistic way to attain this would be to require a practicum of sorts prior to graduation. Furthermore, A person could surmise from the information that through a lack of partnership on behalf of the aviation and aerospace industry, and postsecondary academic institutions, that our workforce could be unprepared. This could be true if not for possible experience of potential safety managers, along with the existence of certificate programs. The existence of certificate programs may in fact be a better pathway towards a well-prepared safety manager. With that in mind future research on workforce preparation is warranted.

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Appendixes

Appendix A: Interview Questions

Research Question

What are the perceptions of industry safety professionals in aircraft and airport safety management on the academic training of safety professionals in the United States?

Interview Questions

1. What current aviation/aerospace industry skills and knowledge are needed by graduates from post-secondary academic safety programs?
2. What current specialized qualifications or certifications are needed for aviation safety professionals?
3. What knowledge and skills are directly related to Federal requirements and programs?
   a. Should this knowledge be required for the preparation of graduates?
4. What level of understanding of future Federal requirements and programs will be needed by graduates (within the next five years)?
5. What (if any) industry certifications would be best served for graduates of post-secondary academic safety programs to attain prior to graduation?

Note:

Basis of Questions. The interview questions are based upon the industry expert answering, and their having an understanding of what the needs and requirements of the aviation and aerospace industry are. In order to bring safety understanding to management the Federal Aviation Administration (FAA) is in the process of devising a comprehensive plan to implement greater requirements for the aviation and aerospace industry (Remawi et al, 2011). This process allows for the management of an aviation or aerospace organization to take into account safety and manage through the empowerment of personnel as the subject matter experts of the organization. Building an overall safety approach within an organization, in the most efficient manner, requires the adoption of safety programs, better training for personnel, and higher qualification standards pertaining to job readiness (Lu et al, 2011).

Vetting/Field Test of Questions. The interview questions were vetted by five professionals from the aviation and aerospace industry. Two were retired military aviators, and both currently work in airport management. The three remaining professionals have worked in aviation and aerospace safety management for over 25 years each. The parameters and purpose of the research project were explained to each of the five professionals. The five professionals were then given and asked to review the interview questions for relevance to the research study and their thought about the questions being able to elicit rich data. The overall opinion from the professionals was that the listed questions were well rounded and took into account different aspects of the aviation and aerospace industry. Each of the five professionals noted that the questions examined training, requirements, legislation, and certifications. All were deemed of interest by the professionals and none noted any need to change the questions.

Appendix B: Interview Protocol

An interview should be able to respond to each situation in a sensitive way in order to elicit the richest possible data. Prior to scheduling or conducting any interviews, open-ended questions are developed according to what is recommended for a standardized, open-ended interview protocol (Seidman, 1998). All of the questions will be asked during each interview, but not necessarily asked in the same order and they will sometimes be reworded during the interview if participants require more clarity. These are both characteristics of the interview approach. By blending these two methods, participants will be provided with a loosely structured but comprehensive framework for a discussion. It will also provide the interview with the flexibility to pursue interesting leads as they may arise.

The questions developed for the interviews were designed to elicit the participants' perspectives on needs and requirements of the aviation and aerospace industry. The goal is to ask clear questions about one aspect at a time. Additionally, every effort will be to ask open-ended questions that will invite the participant to become involved in a conversation, as shown in Appendix A. Asking the participants to describe the needs and requirements of the aviation and aerospace industry is one of way to elicit rich detail.

The relationship a researcher negotiates with a participant is a complex and changing entity (Maxwell, 2005). The first task of the interview is to establish a good rapport with the participant and maintain a good working relationship throughout the interview. Before scheduling an interview, participants' will be messaged through LinkedIn, as shown in Appendix C, to arrange a convenient meeting time to interview them in their nearest public library or via Skype. Each interview will be followed up with a thank you note, and each participant will be presented with a monetary gift card as a token of appreciation.

The parameters of the research project will be reviewed with each participant prior to the interview, with them being asked to sign two copies of the Informed Consent Form, as shown in Appendix D: one for the study file and one for each participant to keep. The participants will know that the purpose of each interview is to discuss their perspectives on the needs and requirements of the aviation and aerospace industry because of the LinkedIn Interview Participation Request, as shown in Appendix C, but they will not be given the interview questions beforehand. At the beginning of each interview the research objectives will be reiterated, and the procedure used to develop the interview questions will be reviewed. Throughout this process it is important to remain cognizant of the fact that participants' responses may be influenced by the interview situation, the nature of the questions, and by other extraneous dimensions, including how well interviewer and participant interact. While acknowledging these effects, it becomes important to minimize them. For example, make an effort to diminish status differences with both interviewer and participant presented as equals, a fellow aviation professional, with the position adopted as that of a learner as opposed to an academic. This may help to reduce the hierarchical relations that may be inherent in interview situations (Fontana & Frey, 1994). The participants will be assured that interest rests with their perspectives, and an effort will be made to avoid asking leading questions and unduly influencing their

responses. If they ask a question, the response will be brief to keep the conversation going, and then return to the topic at hand.

When necessary, the questions may be rephrased to clarify them and with an effort to ensure that participants feet comfortable at all times. Appropriate feedback will be made to pace the interview, for example by nodding to show understanding. Sufficient time will be devoted to answering critical questions and encourage participants to recount details of their working experience. By sticking with these dimensions rich data may be elicited.

Occasionally, it may become important to ask for more clarification in a subsequent e-mail. As soon as the transcripts are completed, they will be e-mailed to each participant. Thus each participant will have a full record of the interviews and the possibility arises for any feedback regarding possible inaccuracies in the transcribed texts. Additionally, when the completed transcriptions are e-mailed to the participants, they will be asked for their positive feedback. Their comments will be considered during any revisions. In this way, these narratives became negotiated texts, although the right will be retained as a researcher to edit the final versions of the stories as seen fit. Sharing of the final report with respondents helps to increase its trustworthiness and credibility (Lincoln & Guba, 1985). The interviews will be taped using a Sony Digital Voice Recorder. This allows each interview to be stored and electronically filed. Detailed verbatim texts of the ongoing dialogue between the interviewer and the participant will be transcribed. The texts will be formatted so as to show the exchange of conversation, with each new speaker beginning a new paragraph.

Following each interview, the voice file will be reviewed and a contact summary written. A contact summary is a single sheet with focusing questions that allows the researcher to summarize the main points in each interview (Miles & Huberman, 1994). The questions developed focus on the main themes about the needs and requirements of the aviation and aerospace industry, as well as any changes in thinking about these issues, as shown in Appendix A. These contact summaries will be used to describe critical first impressions and will be referred to periodically throughout the research process as way to triangulate the data.

In order to protect the study contributors from any risk of harm, several precautions will be taken. The risks to the participants will be minimized through the confidentiality of the data. The names associated with the data collected through the interview responses will remain anonymous and interview responses documented in the final report will not be attributed to any one specific individual. Additionally, interview responses will not be revealed by the researcher to any third party. After transcription the digital recordings and the transcriptions will be retained for seven years in a secure file. After the seven years all digital recordings and transcriptions will be destroyed by means of a crosscut shredder. The names of participants will be confidential during the data gathering process.

Appendix C: LinkedIn Interview Participation Request

Hi (name to be entered here),

My name is Dr. Timothy B. Holt and I'm researching what the thoughts are on the preparedness of graduates of postsecondary academic safety programs, and it's my hope that you can participate in the study. The study is interested in your thoughts and opinions about what the needs and requirements of the aviation and aerospace industry are with regards to the safety manager. You were selected because of your training and expertise in the aviation and aerospace industry.

There is a direct benefit to you for participating in this research that revolves around training, and the possibility of a better prepared safety professional. The results will have scientific interest that may eventually have benefits for the aviation and aerospace industry and the future career readiness of graduates from post-secondary academic safety programs. The research may be able to help the trainers better prepare the safety program graduates to work in the aviation and aerospace industry. A better trained and consistently educated safety professional may be career ready and better able to function within the aviation and aerospace industry.

This interview will be conducted on personal time outside of business hours as to not take away from what is already a busy schedule for you. If you have any questions please contact me at the following:

480-323-8064, timholt42@cox.net

I truly appreciate your time and consideration.

R/Timothy B. Holt, Ph.D., FRAeS, C.M.

Appendix D: Informed Consent Form

Informed Consent Form

21st Century Aviation Safety Requirements Necessitates a Practicum in Postsecondary Educational Safety Programs.

What is the study about? This study is interested in your thoughts and opinions about what the needs and requirements of the aviation and aerospace industry are with regards to the safety manager. You were selected because of your training and expertise in the aviation and aerospace industry. There is no deception in this study.

What will be asked of me*?* You will be asked to answer some questions during an interview to help answer what are the perceptions of industry professionals in safety management on the training of safety professionals and the movement of aircraft, ground vehicles and people. This interview will be conducted on personal time outside of business hours as to not take away from what is already a busy schedule for you. It will take one hour to an hour and a half in time total and be completed at the closest public library (for those local) or via Skype.

Who is involved? The following person is involved in this research project and may be contacted at any time: Dr. Timothy B. Holt

Are there any risks*?* There are no known risks in this study, either professionally or personally. However, you may stop the study at any time. You can also choose not to answer any question that you feel uncomfortable in answering.

What are some benefits*?* The results will have scientific interest that may eventually have benefits for the aviation and aerospace industry and the future career readiness of graduates from post-secondary academic safety programs. The research may be able to help the trainers better prepare the safety program graduates to work in the aviation and aerospace industry. A better trained and consistently educated safety professional may be career ready and better able to function within the aviation and aerospace industry.

Is the study anonymity/ confidential*?* These data collected in this study are confidential. Your name or personal information is not linked to data. Only the researcher in this study will see the data.

Can I stop participating in the study? You have the right to withdraw from the study at any time without penalty. You can skip any questions on the interview if you do not want to answer them.

What if I have questions about my rights as a research participant or complaints?
If you have questions about your rights as a research participant, any complaints about your participation in the research study, or any problems that occurred in the study, please contact the researcher identified in the consent form.

We would be happy to answer any question that may arise about the study. Please direct your questions or comments to: Dr. Timothy B. Holt, 480-323-8064, holtt@erau.edu.

Signatures

I have read the above description for the study entitled, **21st Century Aviation Safety Requirements Necessitates a Practicum in Postsecondary Educational Safety Programs**. I understand what the study is about and what is being asked of me. My signature indicates that I agree to participate in the study.

Participant's Name: _____ Researcher's Name: _____

Participant's Signature: _____ Researcher's Signature: _____

Date: _____