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Listening to the Ranks: Perceptions of the U.S. Air Force Occupational Health and Safety Training

Melissa Jo Breunig
University of Nevada, Las Vegas, mbreunig2@uwalumni.com

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LISTENING TO THE RANKS: PERCEPTIONS OF THE U.S. AIR FORCE
OCCUPATIONAL HEALTH AND SAFETY TRAINING

By

Melissa Jo Breunig

Bachelor of Science – Natural Sciences with Honors
University of Wisconsin – Madison
2012

A thesis submitted in partial fulfillment
of the requirements for the

Master of Public Health

Department of Environmental and Occupational Health
School of Community Health Sciences
Division of Health Sciences
The Graduate College

University of Nevada, Las Vegas
December 2014

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We recommend the thesis prepared under our supervision by

Melissa Jo Breunig

entitled

Listening to the Ranks: Perceptions of the U.S. Air Force Occupational Health and Safety Training

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Carolee Dodge Francis, Ph.D., Committee Chair
Shawn Gerstenberger, Ph.D., Committee Member
Jennifer Pharr, Ph.D., Committee Member
Russell Hurlbert, Ph.D., Graduate College Representative
Kathryn Hausbeck Korgan, Ph.D., Interim Dean of the Graduate College

December 2014

ABSTRACT

Listening to the Ranks: Perceptions of the U.S. Air Force Occupational Health and Safety Training

by

Melissa Jo Breunig

Dr. Carolee Dodge-Francis, Examination Committee Chair
Assistant Professor of Environmental and Occupational Health
University of Nevada, Las Vegas

Occupational health and safety hazards are abundant in military environments. Due to the hazardous occupational settings, injuries remain a public health concern in the United States military. Public health plays a critical role in injury reduction by addressing the need for comprehensive safety education training, and more specifically, exposure related injuries. A secondary data analysis was completed using Communication Theory as the overarching framework to analyze 13 qualitative interviews conducted with Airmen to gain their perceptions of the occupational health and safety training at Nellis and Creech Air Force Base (AFB). Pedagogy and training content were the two main themes that emerged from Airmen interviews. The purpose of this qualitative bound instrumental case study is to describe the perceived effectiveness of the occupational health and safety training programs by Airmen at Nellis and Creech AFB.

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Lastly, the views expressed in this academic product are those of the author and do not reflect the official policy or position of the US government or the Department of Defense.

DEDICATION

To those who serve, especially my fiancé,
thank you for the sacrifices you are willingly to make to keep us safe.

TABLE OF CONTENTS

ABSTRACT.....	iii
ACKNOWLEDGEMENTS.....	iv
DEDICATION.....	v
LIST OF TABLES.....	viii
LIST OF ACRONYMS.....	ix
CHAPTER 1 INTRODUCTION.....	1
Focus of Study.....	1
Purpose of Study.....	3
CHAPTER 2 THEORETICAL AND LITERATURE REVIEW.....	4
Military Occupational Health and Safety.....	4
Communication Theory.....	7
Education as Injury Prevention.....	9
Occupational Health and Safety Training.....	11
Case Study Framework.....	15
Summary.....	17
CHAPTER 3 METHODOLOGY.....	18
Occupational Health Internship.....	18
Site of Study.....	21
Institutional Review Board.....	22
Research Methods.....	23
Data Collection Process.....	24
Data Analysis.....	28
Validity and Reliability.....	30
CHAPTER 4 RESULTS.....	32
Pedagogy.....	32
Training Content.....	35
Summary.....	41
CHAPTER 5 DISCUSSION AND IMPLICATIONS.....	42
Discussion.....	42
Implications.....	44
Bias and Limitations.....	45
Conclusion.....	46

APPENDIX: USAF RESEARCH DETERMINATION	48
REFERENCES	49
VITA.....	55

LIST OF TABLES

Table 1	Occupational health and safety trainings created and/or briefed by occupational hazard.....	20
Table 2	Demographic data on the 12 Airmen and 1 civilian interviewed after receiving either formaldehyde or laser radiation occupational health and safety training.....	26

LIST OF ACRONYMS

AFB	Air Force Base
CDC	Centers for Disease Control and Prevention
CFR	Code of Federal Regulations
DoD	Department of Defense
ESOH	Environment, Safety, and Occupational Health
HAZCOM	Hazard Communication Training
IMTEE	Integrated Model of Training Evaluation and Effectiveness
IRB	Institutional Review Board
LEP	Laser Eye Protection
LSO	Laser Safety Officer
NASSP	National Association of Secondary School Principals
NIOSH	National Institute of Occupational Health
OHS	Occupational Health Section
OSHA	Occupational Safety and Health Association
UNLV	University of Nevada Las Vegas
US	United States
USAF	United States Air Force

CHAPTER 1

INTRODUCTION

Safety of military personnel is of utmost importance considering the dangers of their occupational environments. The importance of prevention of military occupational exposures has been recognized in recent years (Gaydos, 2011). Yet, job related injuries remain one of the most “underrecognized problem of the U.S. military” and may lead to under-estimation of injuries (Amoroso, Bell, Baker, & Senier, 2012). Service members are ordered to work in diverse occupational environments, which dramatically increase their risk of injury resulting from hazardous exposures (i.e. chemical, laser). Injuries related to occupational exposure occur not only during deployments, but can occur at any time and on any installation where United States (U.S.) military personnel are stationed.

According to Sleet and Moffett (2009), injury control and prevention is effective using a public health approach. The public health view of injuries is as “unintentional or intentional damage to the body resulting from acute exposure to thermal, mechanical, electrical or chemical energy or from the absence of such essentials as heat or oxygen” (p. 90). Successful injury prevention necessitates the public health approaches of modifying individual or population “behavioral risks, [and] reducing exposure to hazardous environments” (p. 90). Education is one successful strategy utilized to promote these changes (Sleet & Moffett, 2009).

Focus of Study

The focus of this study is occupational health and safety education, specifically education surrounding chemical and laser safety. The U.S. Army has reported 26,354 hospitalizations caused by poisons, fire, and hot/corrosive substances, typically thought

of as chemical injuries, from 1980 to 2002 (Amoroso et al., 2012). That corresponds to 8.69 percent of all the injury hospitalizations, and demonstrates a need for improved chemical safety among military personnel (Amoroso et al., 2012). The United States Air Force (USAF) specifically reported 1.8 percent of Airmen hospitalized for non-battle injuries in 2006 were related to poisons, fire, or hot/corrosive substances, and 969 Airmen were hospitalized for general injuries/poisoning in 2006 (Jones, Canhan-Chervak, Canada, Mitchener, & Moore, 2010).

Beyond chemical injuries, military applications of lasers have expanded in recent years and pose a real hazard to military personnel (Whitmer & Stuck, 2009). According to a unified database pooling incidents from three of the major laser databases (the Rockwell Laser Industries Laser Accident Database, the U.S. Army Medical Research Detachment of the Walter Reed Army Institute of Research's Laser Accident and Injury Registry, and the Food and Drug Administration's Centers for Devices and Radiological Health), from 1965 to 2002 there were 29 military laser injuries: 6 occurred in the USAF, 15 in the U.S. Army, and 8 in the Navy/Marines (Clark, Johnson, & Neal, 2004). Clark et al. (2004) were also "doubtful that these encompass all laser incidents" that occurred during that 37 year period (p. 239). Another study of laser eye injuries by Harris, Lincoln, Amoroso, Stuck, & Sliney (2003) indicated that these types of injuries repeatedly go unreported because "many laser beams are invisible [and] patients may not realize they have been exposed" leading to low numbers of reported laser injuries (p.948). Low and underreporting of military personnel injuries may also be due to the difference between civilians needing to file worker's compensation claims, "whereas active duty [personnel are] afforded a continual paycheck regardless of filing status" (Smith, 2002, p. 614).

Despite this low reporting, disability and medical costs from laser injuries can be sizeable and create a need for improved laser training to decrease injuries (Harris et al., 2003).

A study conducted by Hambach et al. (2012) addressed the problem of chemical safety education in Belgium. Comprehension of chemical safety education was improved through focus group driven research to elucidate worker's perceptions of chemical risk in the workplace as a prerequisite for a safety education program (Hambach et al., 2012). By taking a participatory approach, the authors were able to design comprehensive safety education.

Purpose of Study

There is currently no known research regarding Air Force occupational health and safety education driven by Airmen participation using qualitative methods. Therefore, the purpose of this case study is to answer the question: how do Airmen perceive the effectiveness of the occupational health and safety education programs at Nellis and Creech Air Force Base (AFB) to improve safety education comprehension.

CHAPTER 2

THEORETICAL AND LITERATURE REVIEW

The literature review for this study utilizes scholarly publications from peer-reviewed journal articles, texts, and government reports. The articles were found searching the University of Nevada Las Vegas' (UNLV) library databases and the Defense Technical Information Center during the months of May 2013 through February 2014. Multiple searches were conducting during the timeframe using keywords such as: occupational health, safety, military, education, learning style, communication, training, participatory training, training effectiveness, laser injury, chemical injury, qualitative research, and case study. The searches were limited to articles from scholarly publications in peer-reviewed articles, scholarly subject matter texts, and government reports. Articles and government reports were limited to full text articles available online, and texts were either online or available through UNLV library. This literature review excluded non peer-reviewed journal articles.

Results from the literature are provided in the sections that follow providing insight to occupational health and safety in the U.S. military, how communication theory is the overarching framework of the study, that education can be used for injury prevention, the complexities of occupational health and safety training, and explains the qualitative research approach of case study and how it pertains to occupational health and safety.

Military Occupational Health and Safety

Working in the military includes many potentially hazardous occupations due to the combat or hostile environments that military men and women endure while deployed

(Gaydos, 2011). However, the risks of occupational injuries blur the boundary between in-theater (deployed) injury and injury occurring on U.S. soil. Military personnel can also be thought of as federal employees and not just as Soldiers, Airmen, Sailors, or Marines (Deeter & Ruff, 1993). When military personnel are working non-combat jobs similar to other civilian workers, the military needs to address the hazards of their working conditions just as work conditions are monitored for non-federal employee civilians (Deeter & Ruff, 1993).

The Public Law 79-658, *Health Promotion for Government Employees* (1946 amended), was the first law that allowed health services for federal civilian employees (Deeter & Ruff, 1993). This law established, but did not require, that federal agencies could provide health services to their employees concerning: “treatment of on-the-job illnesses, the treatment of dental conditions that require emergency attention, preplacement and other job-related health maintenance examinations, the referral of employees to private physicians and dentists, and preventive programs related to health” (Deeter & Ruff, 1993, p. 62). Almost 25 years later, the federal government passed The Occupational Safety and Health Act of 1970 that required “all employers [to] provide a safe and healthy working environment for all of their employees” (Deeter & Ruff, 1993, p. 62). Initially this legislation was exempt for federal employees even though some federal workers performed comparable industrial tasks to non-federal employees. The Occupational Safety and Health Act was later amended to require safe working environments for military and civilian Department of Defense (DoD) employees too (Gaydos, 2011). This is the first time that the federal government made occupational

safety and health a precedent by “ensuring the development and enforcement of meaningful workplace standards” that included military personnel (Gaydos, 2011, p. 6).

Now the DoD has issued its own guidelines on occupational health and safety in the *Occupational Medical Examinations and Surveillance Manual*. This manual addresses specific occupational exposures, medical examinations, and surveillance of specified Occupational Health and Safety Administration (OSHA) hazards (Department of Defense, 2007). An extensive list of OSHA regulated hazards can be found in the code of federal regulations (CFR) as 29 CFR 1910 for general industry, which guides military occupational health and safety standards (Occupational Safety and Health Standards, 1989). 29 CFR 1910 provides thorough guidelines on how to monitor the hazards, how to remain compliant, medical surveillance for exposed employees, and the hazard training requirements. Employers are responsible for following the directions detailed in the regulations to ensure employees have safe working conditions as defined by OSHA.

Environmental, Safety, and Occupational Health (ESOH) risk management is also seen by the DoD as a means to attain mission sustainment and remain OSHA compliant. The DoD believes that ESOH risk management encompasses “hazardous materials and waste, environmental and occupational noise, personnel safety and occupational health, natural environmental assets and infrastructure, compliance with numerous regulations, and system safety and explosive safety” (Huheey, 2005, p.5). ESOH is an integral part of the larger military system because it is able to intervene on several levels for health and safety of personnel to remain OSHA compliant. Safety interventions can address the hazards by: removing them if possible, mandating use of personal protection equipment, building in warning systems, or through training when hazards cannot be removed from

the environment (Huheey, 2005). Total integration of the ESOH risk management in the DoD can help prevent injuries, lower medical expenses, and optimizes mission readiness for military personnel.

Beyond the enforcement and integration of occupational health and safety laws, Sleet and Baldwin (2010) speak to how serious injury prevention is to the military. They view injuries with a “public health approach to [identify] the causes and consequences” (Sleet & Baldwin, 2010, p. S218). The unique structure of the military, in terms of occupational training and procedure, positions this population to contribute to the literature base of occupational injury and prevention when data can be made available for review. Through collaborative efforts of the USAF with civilian public health professionals, a public health perspective is applicable to the prevention of military related occupational injuries, because as Sleet and Baldwin (2010) says, “it wouldn’t hurt to create a safer military...it would save lives, reduce days lost, save money, and preserve our investment in force protection” (p. S220).

Communication Theory

Communication between health and safety officials and workers is at the root of improving safety trainings and work environments (Roskam, 2001). Roskam (2010) noted that public health recognizes the importance of communication as a tool to provide education. Communication Theory, described by George Gerbner in 1985, is the overarching framework of this study (Finnegan & Viswanath, 2002). Gerbner’s framework includes three branches of study: the first is concerned with constructing meaning from the signs, symbols, and codes we use to communicate; the second uses the study of behavior and interactions after exposure to a message to explain

communication's effect on cognition; and the third looks at how communication is "organized through large-scale social ... systems" (Finnegan & Viswanath, 2002, p. 362).

According to Finnegan and Viswanath (2002), "communication [studies] may be further broken down to examine effects at various levels of human experience on a 'macro to micro' level" (p. 362). Beginning at the 'micro' level, the research explores how individuals interpret the information they are given and how group organization influences communication, all the way to the 'macro' level of understanding how society or culture contributes to communication (Finnegan & Viswanath, 2002). Communication studies also view the individual or audience as active participants in influencing the media they seek (Finnegan & Viswanath, 2002). Communication theory seeks to better understand how audiences' view the messages they receive and to gain a perspective on how communication can be used more effectively.

Communication theory has two major areas of study: message production and media effects. Message production studies investigate the social and organizational factors at play in the media (Finnegan & Viswanath, 2002). They look at who sends the message, what channels deliver the message to the target audience, and how this affects health behaviors. Media effects address "the consequences of media exposure on individuals, groups, institutions, and social systems" (Finnegan & Viswanath, 2002, p. 365). On an individual level, media effects assess the outcomes gained from the communicated messages like knowledge gained or behavioral modifications (Finnegan & Viswanath, 2002).

Considering outcomes related to occupational health and safety, the media effects of risk communication, or how individuals or groups consider risk in their environment,

can connect the individual to the community level of analysis (Finnegan & Viswanath, 2002). Burke, Scheuer, & Meredith (2007) emphasizes the importance of dialogue, or communication, for the field of health and safety training. They view conversation as a “central process of learning” and that engagement during training can help a trainee better understand the experience and message of the training (Burke et al., 2007, p. 236; Burke et al., 2006). Engagement in training messages can then translate into health and safety knowledge and skills.

Education as Injury Prevention

Communication theory provides a foundation for understanding the perceived effectiveness of USAF’s occupational health and safety education training. This will improve the communication of educational information and Airmen’s overall safety. The successful implementation of occupational safety measures corresponds with the safety and injury prevention mnemonic of the three E’s of safety: engineering, education, and enforcement (Karmis, 2001; Carlson Gielen, McDonald, & McKenzie, 2012). This case study examines the education “E” because education can affect behavioral change and is a “primary approach to preventing unsafe acts” (Karmis, 2001, p. 83). It is important to educate workers through effective safety training.

However, learning does not automatically follow instruction. Learning is stylistic and according to the National Association of Secondary School Principals (NASSP) it can be thought of as “cognitive, affective, and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment” (as cited in Keefe, 1987, p. 5). Learning style is an essential mechanism for the way people learn. As stated by Messick, cognitive style is a

component of learning style that focuses on how an individual processes new information and is “the learner’s typical mode of perceiving, thinking, problem solving, and remembering” (as cited in Keefe, 1987, p. 7). How learner’s process and understand information often relies on the senses. Four main sensory methods of learning have been identified by Keefe (1987) as “1) visualization – a mental picture of some object or activity, 2) written word – a mental picture of the word spelled out, 3) listening – no mental picture but the sound of the word carries meaning, and 4) activity – physical or emotional feeling about the word” (p. 17). An instructor should be aware that learner’s might differ in their dominant cognitive style, and teach using a variety of methods.

Learning can therefore be enhanced when learner’s cognitive styles match the delivery of the material. For example, if someone prefers visualization, use of illustrations or graphics during instruction can improve their learning (Hatami, 2012). Matching of cognitive style and instructional methods becomes an important avenue for ensuring effective learning. Vogel-Walcutt, Fiorella, & Malone (2013) have considered varying instructional methods as a framework for improving military training systems based on academic learning. Military trainings are just as focused on learning as an academic setting, however budgetary constraint dictate a need for streamlined training that is quick and inexpensive but still effective (Vogel-Walcutt et al., 2013).

In the age of computer-based-training and online training resources, the best interest of the military is to keep trainings “learner-centered” and consistent with personnel’s cognitive styles (Vogel-Walcutt et al., 2013, p. 1492). Not all military personnel will have the same dominant cognitive style, but through a combination of presentation methods, trainings can relate to multiple learning styles. Vogel-Walcutt et al.

(2013) suggest that training presentations can utilize various instructional strategies to appeal to all learners. They suggest using multimedia presentations, which have the ability to present information using both visual and auditory cues. Use of pictures and words together can enhance learning especially if text is spoken and emphasized for importance by a trainer. This will underscore the concepts military personnel should recognize as important and allow personalization of the content (Vogel-Walcutt et al., 2013). Lastly, they suggest complex information should be broken down into “manageable...chunks” and presented in a format that is familiar to trainees (Vogel-Walcutt et al., 2013, p. 1494). Focusing on instructional methods that relate to the learning styles of military personnel may help streamline information and training effectiveness.

Occupational Health and Safety Training

Occupational health and safety training encompasses the deliberate education about concepts surrounding safety hazard identification, protection and prevention through work practices, and emergency responses (Robson et al., 2012). The National Institute for Occupational Safety and Health (NIOSH), a government agency responsible for recommendations about worker health, put out a call in 1999 for occupational health and safety training research from a qualitative perspective to consider how training has affected translation into worker practices (Weinstock & Slatin, 2012). McQuiston (2000) echoed the need for research regarding “worker’s safety and health education” training, explaining that in order to create meaningful and effective occupational safety education training, the use of empowering and participatory approaches are necessary (p. 584).

The participatory action research approach connects to the communication framework by encouraging a “dialogue between and among educators and workers” (Roskam, 2001, p. 271). This can involve an outside researcher working with organizational members to improve “the system’s ability to provide members with desired outcomes and contributing to general scientific knowledge” (McQuiston, 2000, p. 587). Research by Hambach et al. (2011) used qualitative methods to elucidate worker’s perceptions of chemical risk in the workplace via focus groups. Through the use of a participatory approach, a safety education program was designed and tailored to the workers’ perceptions of their safety and health risks (Hambach et al., 2011). The impacts of health and safety using a participatory approach to teaching and hands-on learning were also used for the evaluation of the International Chemical Workers Union Council training program by Becker and Morawetz (2004). The research discovered that workers had higher “self-confidence and willingness to make safety and health improvements” after the participatory training (Becker & Morawetz, 2004, p. 70). Hands-on or engaging safety trainings were also found to improve worker knowledge of safety and reduce negative outcomes in a meta-analysis by Burke et al. (2006). Taken together, these studies imply that participatory and engaging approaches are meaningful ways to design and implement safety trainings.

Improvements to occupational health and safety will not come solely by posting educational resources and creating trainings without considering the organizational climate (Smith, 2002). An organization’s climate refers to the “characteristics of workplaces that facilitate or inhibit the exhibition of certain behaviors” (Smith-Crowe, Burke, & Landis, 2003, p. 861). The context of the characteristics of an organization

become important in terms of safety because they can either promote or deter a safety environment for the employees. Management support of occupational safety is an integral part of building an organizational climate that promotes safety at all ranks of the organization (Weinstock & Slatin, 2012; Smith, 2002; Ford & Fisher, 1994). Safety climate is the perceptions shared by management and workers about the environment and safety behaviors that are or are not promoted by an organization (Smith, 2002). The ideal organization would have an organizational climate that consistently reflects a strong safety climate where employees work in an environment that promotes safety and they can practice safety behaviors they learned during training.

Smith-Crowe et al. (2003) found that supportive work environments including management safety attitudes and proper safety training for employees could enhance the transfer of the safety training into higher safety performance. Governmental agencies also play a role in showing support from strong safety climates and safety training (Ford & Fisher, 1994). OSHA is one of the primary governmental agencies that promotes occupational safety training and it recognizes the important roles of management and policy in fostering a safe work environment. Therefore, OSHA regulations for occupational hazards include annual training requirements to ensure safety is continually reinforced or refreshed (Occupational Safety and Health Standards, 1989). Refresher or booster training sessions have been cited in the safety literature as ways to promote safety knowledge and ensure employees are aware of proper safety behaviors over time (Alvarez, Salas, & Garofano, 2004; Smith-Crowe et al., 2003; Ford & Fisher, 1994). The military is not exempt from these standards and, from an organizational level, it to needs

to consider the many factors that come together to encourage strong safety climates within the ranks.

The effectiveness of occupational safety training among military personnel has implications for force readiness and training must be optimized due to temporal and budgetary restrictions (Cannon-Bowers, Salas, Tannenbaum, & Mathieu, 1995). In order to have highly effective training, the varying contexts that influence the training must be considered. Alvarez et al. (2004) and Cannon-Bowers et al. (1995) consider the factors that influence training effectiveness as reactions, learning, behavior, and organizational results based on Kirkpatrick's evaluation model. Alvarez et al. (2004) then created an "integrated model of training evaluation and effectiveness" (IMTEE) (p. 391). The major components of the IMTEE include "training content and design, changes in learners, and organizational payoffs" (p. 393). This study will focus on the training content and design piece of the IMTEE, which encompasses how individual, training, and organizational characteristics affect the major components of the model. Reactions to the trainings then allow researchers to gauge the appropriateness of the trainings and how useful the trainees perceive the training to be (Alvarez et al., 2004). It has been reported that reactions to training may be related to individual trainee motivation, how well they are learning the material, and positive reactions may reflect positive training outcomes (Alvarez et al., 2004; Cannon-Bowers et al., 1995). Analyzing trainee reactions to training content and design is a good starting point for determining the effectiveness of training.

Trainee reactions, though not directly connected to organizational characteristics may be influenced by the organizational climate. A positive learning or safety culture

within an organization may promote trainees to have more positive reactions to training. Training design should embody a “systems-oriented ... basis” to generate higher training success (Cannon-Bowers et al., 1995, p. 161). Therefore, organizations “must not be afraid to re-examine [their] own safety and well-being” systems to ensure the highest quality of occupational safety for their employees (Smith, 2002, p. 614).

Case Study Framework

Qualitative research focuses on “addressing the meaning individuals or groups ascribe to a social or human problem” and the results “[include] the voices of participants” (Creswell, 2013, p. 44). Creswell (2013) defines the qualitative process as an “approach to inquiry, the collection of data in a natural setting sensitive to the people and places under study, and data analysis that is both inductive and deductive and establishes patterns or themes” (p. 44). The definitions of qualitative research by Creswell outline how qualitative research strives for an in-depth understanding of the questions asked compared to a quantitative mindset of finding causal relationship based on numerical explanations (Stake, 1995). Analysis of qualitative questions revolve around the researcher or research teams’ interpretation of the data based on their observations, field experience with the study population and setting, and professional judgments while limiting the influence of their personal perceptions on the interpretation.

Several research approaches are applicable for conducting qualitative methods: narrative research, phenomenology, grounded theory, ethnography, or case study. The case study approach is appropriate for this research study. According to Stewart (2014), “case study is an exploratory form of inquiry, providing an in-depth picture of the unit of study, which can be a person, group, organization or social situation” (p.145). A case

study design is also chosen “when (a) “how” or “why” questions are being posed, (b) the investigator has little control over events, and (c) the focus is on a contemporary phenomenon within a real-life context” (Yin, 2009, p. 2; Stewart, 2014). How and why questions become especially important in the context of injury and illness cases (Smith, 2002). Case studies can be further categorized by type of case or cases to be studied. Stake (1995) recognizes three categories of cases: intrinsic, instrumental, and collective. This study uses the instrumental understanding of a case; meaning the purpose of the cases are to gain in-depth description and understanding of a specific issue, organization, person, or occupation (Grandy, 2010). An instrumental focus will allow themes to emerge from the data collected to better answer “how” and “why” qualitative research questions. In addition, case studies can be further focused through drawing boundaries or bounding a case. Bounding a case is often used to clarify who, what, or where the case is restricted (Elger, 2010). For example, a case could be defined to a specific person or population, a specific theoretical background, or by time and place. Through the bounding of the case, the “unit of interest” remains the focus of the study (Stewart, 2014, p. 147).

Several examples of qualitative case studies can be found in the literature pertaining to occupational health and safety. The literature was heavily concentrated on Hispanic construction workers, studying their perspectives concerning worksite safety training, education, and risk (Brunette, 2005; McGlothlin, Hubbard, Aghazadeh, & Hubbard, 2009; Roelofs, Sprague-Martinez, Brunette, & Azaroff, 2011). Brunette (2005) focused her study on the design, development, and distribution of occupation health and safety training resources specifically for the Hispanic construction workers using

participatory methods to determine utility of the materials. McGlothlin et al. (2009) used a case study approach to elicit perceptions of effectiveness of occupational safety training among Hispanic construction workers. Lastly, Roelofs et al. (2011) utilized focus groups to gain the perceptions of Hispanic construction workers on factors that affect their worksite safety and the reasons behind increased injury rates. These studies support the use of a qualitative case study design in the present occupational health and safety training perceptions study of airmen at Nellis and Creech AFB.

Summary

Occupational health and safety training has played a substantial role in preventing occupational injuries since the passage of the Occupational Safety and Health Act of 1970. The U.S. military has adopted ESOH protocols to help ensure management of occupational hazards and improve force readiness. In order to achieve occupational health and safety, there must be communication between workers, trainers, and/or management to encourage a climate of safety and learning within organizations. Engaging approaches to occupational health and safety trainings as identified by McQuiston (2000) and Hambach et al. (2011) have shown that worker safety can be improved through tailored safety education training. The effectiveness of training can then be judged based on individual, training, and organizational characteristics and how they influence trainee's reactions to the material. This study combines the core concepts of communication and occupational health and safety training in order to bridge the gap in the literature about USAF occupational health and safety education trainings driven by Airmen articulating their perceived effectiveness of the training.

CHAPTER 3

METHODOLOGY

The following section presents an overview of the author's internship that paved the way for this qualitative case study of Airmen at two Air Force Bases in Southern Nevada. The author will provide a description of the study including obtaining Institutional Review Board (IRB) protocols, the research methodology used, and a brief description of the participants.

Occupational Health Internship

The author completed a nine-week internship, prior to this study, with Nellis AFB, Las Vegas, NV in the Occupational Health Section (OHS) of the Public Health Flight in the 99th Aerospace Medicine Squadron of the 99th Medical Group. The experience began early June 2013 and was completed end of July 2013. The purpose of the internship was to improve the process of occupational health hazard and safety training programs for Airmen at Nellis and Creech AFB by updating training requirements, procedures, and policies for the 167 industrial workplaces.

The author had two objectives for her internship project. The first objective was to learn the occupational health process at Nellis AFB encompassing workplace safety, industrial hygiene, and medical surveillance. This occurred through familiarity with Occupational Safety and Health Administration (OSHA), National Institute of Occupational Safety and Health (NIOSH), Department of Defense (DoD), and USAF occupational health and safety regulations. The second objective was to create occupational health and safety training media based on OSHA regulations and on site

workplace visits of exposed personnel to exemplify the importance of training requirements and identify avenues for improvement.

To meet the internship objectives, the author researched regulatory standards and papers on 46 hazards identified as exposures to Airmen at Nellis and/or Creech AFB revealing documentation data concerning training standards and regulations set by federal agencies such as: OSHA, NIOSH, Centers for Disease Control and Prevention (CDC), DoD, and USAF. Google search hits were selected for content that included health and safety regulations, training frequency, special training requirements, and medical surveillance information. USAF regulations were also consulted to verify expanded hazard regulations. The internship preceptor provided the USAF regulations for review.

Data on regulations were tracked for the 46 hazards using a predetermined matrix (i.e. training frequency, whether or not covered through hazard communication (HAZCOM) training, special training requirements, and medical surveillance protocols) in Microsoft Excel. Microsoft PowerPoint was then used to create training presentations for six of the top hazards at Nellis AFB based on data in the matrix. Individual industrial workplace visits on Nellis and Creech AFB were completed to provide additional hazard mitigation experience and to aid in designing training presentations.

Five industrial workplace site visits were completed to provide field experience in operations and hazard mitigation in real time. These visits along with data obtained in the training matrix provided the background for creation of training presentations on five of the top hazards at Nellis AFB, plus two additional hazards (**Table 1**). The author was asked by the Public Health Flight leadership to create presentations that offered a standardized training template for each hazard that followed a specific layout (e.g. OSHA

standard, what is the hazard, occupational exposure routes, health implications, and medical surveillance). Previous Microsoft PowerPoint trainings were given to the author as examples from which she designed brand new presentations. Ample information was included under each category in the presentations to comply with OSHA and USAF training standards and make each occupational hazard easier to understand. Once a training presentation was completed, the internship preceptor and Public Health Flight Commander reviewed them prior to posting to an installation wide portal called SharePoint that is used by squadron supervisors to train Airmen on their specific workplace hazards.

Table 1. Eight occupational hazards from Nellis and Creech AFB were addressed through creation of safety trainings and/or briefing. X denotes how the hazard was addressed.

Occupational Hazard	Training Created	Training Briefed
Occupational Noise	X	
Chromium	X	
Formaldehyde	X	X
Methylene Chloride	X	
Methyl Ethyl Ketone	X	
Benzene	X	
Heat Stress	X	
Laser Radiation		X

Of the seven occupational health and safety training presentations created, two trainings were briefed in July 2013 to one squadron each at Nellis and Creech AFB (**Table 1**). The laser radiation safety training could not be created by the author due to USAF restrictions mandating laser safety materials be created solely by the installation Laser Safety Officer. The laser radiation training presentation used did follow a similar

outline to those created by the author. The author also received training from the Laser Safety Officer prior to briefing the training to the Airmen.

The occupational health improvement project completed by the author was not evaluated in the nine weeks of her internship experience. The evaluation of the training presentation was pursued by the Public Health Flight at Nellis AFB and through a collaborative effort evolved into the thesis study described below. The author's internship provided observational and documentation data about USAF and OSHA standards related to the occupational health and safety trainings. The Public Health Flight at Nellis AFB went on to collect interview data. The thesis analysis utilized both sets of data to determine the perceptions of the Airmen who received the occupational health and safety trainings created during the internship.

Site of Study

The case study site includes both Nellis AFB and Creech AFB. Nellis AFB is located eight miles northeast of Las Vegas, Nevada and is a "major focal point for advanced combat aviation training" and employs a force of about 9,500 military and civilian personnel (99th Air Base Wing Public Affairs, Nellis, 2012). Creech AFB is located near Indian Springs, Nevada and is one of the premier bases for remotely piloted aircraft systems (99th Air Base Wing Public Affairs, Creech, 2012).

To complete this research study, the author needed to gain access to the two sites of study (Stewart, 2014). Entry to the Airmen population was granted through a partnership agreement between Nellis AFB and UNLV. The agreement process began November 2012 and gained approval by the USAF, Nellis AFB, and UNLV in April 2013. The agreement stated that the author would fulfill a summer 2013 internship

working in the Public Health Flight in the 99th Aerospace Medicine Squadron of the 99th Medical Group. The internship focused on occupational health hazards, safety training, and building rapport with installation personnel at Nellis AFB.

Institutional Review Board

Two IRB's were obtained for this study. First, this study needed to gain support through the USAF. The Public Health Flight at Nellis AFB initiated contact with the USAF research board for approval of the evaluation of the Public Health Process Improvement Project. The USAF research determination letter approved the evaluation of the project on 22 July 2013 and considered it exempt from IRB and encouraged the results to be shared within the government and those in the field of public health (**Appendix**). The second IRB exemption approval came from UNLV IRB (Protocol # 1307-4510) for secondary data analysis of data collected by the Public Health Flight at Nellis AFB for the evaluation of the internship project. The author was listed as a student researcher on the UNLV IRB and her chair Dr. Dodge-Francis was the Principal Investigator.

This study is a secondary data analysis because OHS personnel at Nellis AFB conducted all interviews, de-identified the information, and then provided it to the author. Therefore, the author was not required to recruit or consent participants. In accordance with the UNLV IRB protocol, all interview transcripts gathered for this study were kept completely confidential. No references were made in written or oral material that would link feedback to specific Airmen. Study inclusion criteria included Airmen at either Nellis or Creech AFB who attended an occupational health briefing completed by the

author during the internship (**Table 1**). Exclusion criteria included Airmen at either Nellis or Creech AFB who did not attend a briefing apart of the author's internship.

Research Methods

The format of this study is a qualitative bound instrumental case study using secondary data analysis. A case study design was chosen because “(a) “how” or “why” questions [were] being posed, (b) the investigator [had] little control over events, and (c) the focus [was] on a contemporary phenomenon within a real-life context” (Yin, 2009, p. 2; Stewart, 2014). This case study was bound to Airmen at either Nellis or Creech AFB. Case study methodology provides an in-depth understanding of the research question: how do Airmen perceive the effectiveness of USAF occupational health and safety education training at Nellis and Creech AFB. This study was constructed in terms of “how” Airmen perceived their experiences with occupational health and safety training and “why” it was effective or not (Yin, 2009). This was an instrumental case study because Airmen at Nellis and Creech AFB were “providing insight into a particular [job related] issue” (Grandy, 2010, p. 474). The research site allowed access to Airmen by gaining their perceptions and experiences with occupational health and safety training.

The methodology was guided by communication theory. It focused on gathering the perceptions of Airmen who explained how the occupational health and safety education training (i.e. the communication) affected their comprehension of the material. This study began at the ‘micro’ or individual level (i.e. Airmen perceptions), and through the narratives of Airmen and the author's observations, a better understanding of how USAF culture influenced the occupational health and safety education was obtained. Airmen were viewed as both consumers and active participants of media consumption

(i.e. the occupational health and safety education training), which fits the niche of media effects studies.

Data Collection Process

According to Stewart (2014), there can be several techniques for qualitative data collection methods “including interviewing, observations, questionnaires, surveys or almost any other single or mixed method of qualitative or quantitative research” (p. 146). Creswell (2013) also notes that documents either public or private can be used as data. This study capitalized on three of the data collection methods: observations, interviews, and documents to gain insight into the perceptions and experiences of the Airmen with occupational health and safety training.

Observations

“Because a case study should take place in the natural setting of the “case,” you are creating the opportunity for direct observations” (Yin, 2009, p. 109). Airmen were observed at five industrial worksites during site visits for the internship to monitor compliance with safety standards. Supervisors were asked to show OHS personnel their HAZCOM binders and training records for Airmen in their flights. These field visits allowed the author to observe the interactions of the OHS personnel and Airmen in the industrial worksites regarding use of personal protective equipment and implementation of safety regulations. In these instances, the author’s role was as a “participant observer” because she was invited to the worksites as a USAF intern but took an observational role learning about the duties of OHS personnel (Creswell, 2013, p. 165).

The author also recorded field notes during the entire nine-week experience in weekly journal entries. These observations were conducted as a nonparticipant/observer.

This allowed the author to reflect on her experiences and how they affected the occupational safety of Airmen. Field notes also provided the author with an avenue to discuss what she was learning through the internship and track which trainings and meetings she attended related to the OHS. Both of the observation styles were be useful in this study for triangulation of data during analysis.

Interviews

Following the internship, OHS personnel at Nellis AFB initiated an evaluation of the author's occupational health improvement project. OHS personnel conducted evaluation interviews to gain a new perspective from the Airmen about occupational health that could not be identified solely from observations (Stake, 1995). OHS personnel conducted interviews on two separate occasions in early August 2013 with Airmen from one squadron at Nellis AFB and one squadron from Creech AFB. Airmen from Nellis AFB were interviewed individually and the Airmen from Creech AFB were interviewed as a group to encourage greater communication. OHS personnel chose to make this change because the initial round of interviews were shorter than expected, however, they still provided valuable information. All interviews ranged from 5 to 20 minutes.

The sampling technique employed by OHS personnel was purposeful sampling with the criterion that Airmen were in a squadron that had received occupational health training briefings from the author during her internship and were willingly to participate in an audio-recorded interview. Demographic information about the interviewees included 12 Airmen, both Enlisted and Officer Rank, and 1 civilian (**Table 2**). OHS personnel provided no other demographic or indentifying information about interviewees.

Table 2. Demographic data on the 12 Airmen and 1 civilian interviewed after receiving either formaldehyde or laser radiation occupational health and safety training.

Demographics	Number Interviewed
Gender	
Male	11
Female	2
Total	13
Officer Rank	
Major	1
Enlisted Rank	
Airman	1
Airman First Class	5
Senior Airman	1
Staff Sergeant	2
Technical Sergeant	2
Civilian	1
Total	13

OHS personnel utilized eight open-ended questions during their interviews to assess the effectiveness of the occupational health and safety trainings used at Nellis and Creech AFB by considering Airmen’s learning styles, format of trainings, applicability to duty requirements, and possible improvements for the current training course. Interview questions were developed by Nellis AFB Public Health Flight with the guidance of Dr. Dodge-Francis to ensure questions would generate valuable information. The following are the eight questions used in the interviews conducted by OHS personnel:

1. Describe your job at Nellis or Creech AFB? (Including shop)
2. Which occupational health hazard training(s) have you completed?
 - a. Which of these trainings relate to your current workplace hazards?
 - b. Are you in need of current trainings for your current position?
3. How did the training(s) fit your learning style? Explain? Did you feel that the training fit how you learn information? Use examples if not sure what you mean...classroom lecture, video, computer modules, and tests, etc.
4. What parts of the information were you most interested in? Explain?

- a. How well were you able to understand the overall information presented to you? Explain?
5. What work knowledge did you receive from the training(s)? What work skills did you receive from the training(s)? Explain?
6. How did you apply the training(s) to your job duties?
7. How was your most recent training(s) compared to previous experiences?
 - a. Describe the content of these trainings.
 - b. What was the time length between these two trainings?
8. What would you like changed or improved for future training sessions?
 - a. Ask about content (information)
 - b. Environment of training setting
 - c. Length of training (time duration)
 - d. Application of training to work

Some open-ended follow up questions were asked based on Airmen answers to gain further insight into explanations given during the interviews. Transcripts were coded using rank, gender, date of interview, and numbers denoting the speakers by the order they spoke. The author further coded the transcripts to protect the identity of Airmen or civilians in the squadrons from being identified by their rank and/or gender in this manuscript.

Documents

The final data collection method involved occupational safety regulations and guidelines from NIOSH, OSHA, and USAF. According to Marshall and Rossman (1999), document review is an “unobtrusive method” for gaining insight in the participants of the study (p.116). The author was able to acquire knowledge on the requirements for training and medical surveillance Airmen needed for each occupational hazard using the documents. The regulations and guidelines were also useful for further triangulation of

observation and interview data regarding training schedules and what hazards Airmen should receive trainings for (Creswell, 2013; Stake, 1995; Yin, 2009).

Data Storage

For data storage, the author saved internship materials, interview transcripts, observations on her password-protected computer. In accordance with the UNLV IRB protocol, all interview transcripts gathered in this study were kept completely confidential. No references were made in written or oral material that would link feedback to specific Airmen. All information will be kept for five years after completion of the study and then the material will be destroyed.

Data Analysis

The author conducted secondary data analysis after receiving the interview transcripts from OHS personnel at Nellis AFB. According to Creswell (2013), there are five steps for qualitative data analysis: organizing the data, reading and memoing, classifying data into codes and themes, interpreting the data, and data representation. The author followed these steps in the analysis of this study and was supported through the process by her committee chair, Dr. Dodge-Francis, who is a qualitative research expert. All data analysis was done by hand without the use of a computer analysis program.

The first step in the analysis process was to organize the data for easy management. The author organized the interview transcript files using a numbering system corresponding to the order in which the interview took place. Regulations and guidance, and training presentation research were respectively saved in separate file folders for easy reference. All hard copies were organized by hand into folders based on their type of data (i.e. observation, interview, document). The process of data

management allowed the author to become familiar with all the data available for analysis (Marshall & Rossman, 1999).

The second step in the analysis process was to read through the interviews and observations while writing notes or memos at the same time. Memos are “ideas about codes and their relationship as they strike the analyst while coding” in this step (Miles & Huberman, 1994, p. 72). They help to “tie together different pieces of data into a recognizable cluster” (Miles & Huberman, 1994, p. 72). The author wrote her memos in the margins and throughout the text of the interview transcripts and highlighted her observation journal to correspond to the memos. These notes became the basis for the “initial codes” identified in the next step (Creswell, 2013, p. 190). The initial codes included the following: types of learning, standards, review, protection, timeframe, format, improvements, usefulness, enforcement, and protection.

The third step in the analysis process was to classify the data into codes and themes. The author began by creating codes that were “tags or labels for assigning units of meaning” to the data (Miles & Huberman, 1994, p. 56). This provided the author with the perceptions the Airmen held about occupational safety training and her related observations. Data could then be narrowed through a funneling approach to expose the key themes and ideas trapped with the text (Creswell, 2013; Stewart, 2014). Initially, there were nine codes that needed to be funneled down to expose the major themes identified in the next step.

The fourth step in the analysis process was to interpret the data, which involves an inductive approach driven by the data by “letting your categories emerge from [the] data” to create the themes and codes (Schreier, 2012, p. 25). The meaning drawn from the

themes was done through the analysis of “recurring ideas or language, and patterns of belief that link people and settings together” and was used to formulate the meaning of the data (Marshall & Rossman, 1999, p. 154; Stake, 1995). From these main themes, “a number of subcategories” emerged to “specify the meanings in the [the] material with respect to these main categories (Schreier, 2012, p. 61). To achieve this, the author analyzed the list of codes to discover the themes that lead to an understanding of the particular “behaviors, issues, an context” of the case (Stake, 1995, p. 78). Dr. Dodge-Francis also examined the themes and codes identified to ensure the author properly completed data analysis.

The final step in the analysis process was to represent or package the data in visual form (Creswell, 2013; Miles & Huberman, 1994). Mapping the codes can help depict how the data connect (Miles & Huberman, 1994). The author used a hierarchal diagram to visualize how the codes fell into place beneath the themes. This enabled the author to see how the codes and themes fit together to in the context of occupational health and safety training for this case.

Validity and Reliability

Throughout this case study, Stake’s (1995) question: “Do we have it right?” came to mind while determining how to ensure validity and reliability (p.107). To answer this question, the author utilized several approaches including triangulation, intercoder reliability, and followed Stake’s (1995) checklist for a “good case study” (p. 131).

For validation of the case study, triangulation of the data was used. According to Creswell (2013), triangulation is the “use of multiple and different sources, methods, investigators, and theories to provide corroborating evidence” (p. 251). Schreier (2012)

also notes that validity is the consistent use of a coding frame that represents “the concepts under study” (p. 175). This case study utilized multiple sources of data including observation, interview, and documentation, and had an additional investigator review the data. A single coding frame was also consistently used across all data sources. By considering the various perspectives, the author was able to increase the validity of the case study (Marvasti, 2004).

For reliability of the case study, intercoder agreement, or “a consistency check” where another person also codes the data was used (Schreier, 2012, p. 34; Miles & Huberman, 1994). Dr. Dodge-Francis acted as the secondary coder for this study. She reviewed the author’s analysis of the data to verify accuracy of themes and codes (Marvasti, 2004). Dr. Dodge-Francis confirmed the themes and codes identified by the author.

This case study also followed the “critique checklist” provided by Stake (1995) for determining a “good case study” (p. 131). Stake (1995) notes that the author must provide an adequate case definition and provide the reader with sufficient background experience to understand the case. Triangulation of data is necessary (Stake, 1995). The author must also effectively use quotations during analysis and presentation of the results to ensure the context of the data is respected (Stake, 1995). Finally, the author must explain his or her role in the case (Stake, 1995).

CHAPTER 4

RESULTS

The following themes and codes were identified from secondary data analysis of the interview, observation, and document data. The author established the themes based on the grouping of codes that reoccurred throughout all three forms of data. Two major themes were identified through the data analysis including: pedagogy and training content. Each theme has three codes that represent more in depth information about the themes that were present in the data and are described below.

Pedagogy

The first theme that emerged was the pedagogy – the art, science, or profession of teaching (Pedagogy, 2012). This encompassed how the occupational health and safety trainings were conducted, how airmen learn best, and the timeframe for training occurrence. These codes were found in all three types of data.

Current Training Format

The reactions to the trainings that the Airmen offered allowed the author to better understand how well the trainings fit their needs (Alvarez et al., 2004). Considering how trainings were formatted can make a difference in how well the Airmen were able to understand and learn the information being provided (Burke et al., 2006; Burke et al., 2007).

The Airmen discussed the difference between receiving the study training in the briefing format versus completing training on their own with books or PowerPoint slides alone. Interview 6.A (2013) commented on how it was better to “actually have somebody reading it to you who has actual knowledge and can put their own spin on stuff. Rather

than you just reading something and pretending to understand it.” Burke et al. (2006) also found that the more engaging safety trainings were able to improve safety outcomes. Two additional interviewees expressed similar feelings about the format of the trainings, “other trainings had the same content but ... it was just a on a piece of paper and not as interactive” as this briefing (Interview 5, 2013). A third added how the increased interactions of the briefing format “forced you to pay attention to it more” (Interview 6.C, 2013). The author also observed how in-person briefings allowed the Airmen an opportunity to ask questions to better understand complicated material and standards that related to daily duties and shop specific situations. Overall, the increased interaction of the briefing format seemed to benefit the Airmen in terms of influencing attention spent on the information and hopefully improving their understanding as a consequence.

Learning Style

How the occupational health and safety trainings are presented plays a role in the “central process of learning” according to Burke et al. (2007, p. 236). The second code of this theme reflects how the various types of learning styles of the Airmen were affected by the delivery method of the training (Keefe, 1987; Hatami, 2012).

Airmen reported learning styles of visual, auditory, and tactile. Utilizing training formats that are “learner-centered” based on learning styles can be beneficial (Volgel-Walcutt et al., 2013, p. 1492), as was mentioned by interviewee 1, “it was nice to be able to see it on the screen and hear it as well” (Interview 1, 2013). Others added that because they were visual learners they, “liked all the pictures of the hazards because I think it made it more realistic and you could see that it happened to other people” (Interview 6.H, 2013) and that explanations with pictures helped them better understand the diagrams

(Interview 6.D, 2013). Interview 5 (2013) further favored having a training fit both visual and auditory learning styles saying, “It was a PowerPoint and it had some visual aids as well as verbal so it was good.” The trainings did try to accommodate both visual and auditory learners in order to reach a broader set of Airmen with varying learning styles.

Time Matters

Occupational health and safety trainings have requirements for how often workers must be trained and refreshed on the subject (Occupational Safety and Health Standards, 1989; Department of Defense, 2007). These standards were used as document data to guide the author in understanding the timeframe requirements for training each of the hazards. In all five of the military personnel interviews, interviewees acknowledged having previously received training on the topic at least annually. This is the appropriate timeframe according to both the DoD manual and OSHA requirements (Occupational Safety and Health Standards, 189; Department of Defense, 2007). However, the civilian reported not having received recent safety training, but did answer they understood the information from being “through it several times” (Interview 4, 2013).

One important reason for annual training is for the training content to become a review or refresher for the Airmen (Occupational Safety and Health Standards, 1989; Department of Defense, 2007). Several interviewees echoed this sentiment: “it was just a review” (Interview 1, 2013), “pretty much it just told me what I already knew” (Interview 3, 2013), and “it was just a refresher” (Interview 4, 2013). Training should help establish a need for safety in the workplace and this was reiterated by Interview 5 (2013), “it’ a refresher to ensure that I keep myself and my staff safe back there in our work section. So yeah it does improve my abilities to perform my responsibility.”

Additionally, one interviewee acknowledged they were unsure if they were supposed to receive the more general safety training given during the brief just as often as a more shop specific version that is also required annually (Interview 6.C, 2013). OHS personnel clarified training requirements at the time of the interview and the interviewee expressed gratitude for time spent training the group on one of their prominent occupational hazard.

Training Content

The second theme that emerged was the training content. This encompasses the information presented in the occupational health and safety trainings, the suggested improvements that could be made to the trainings, and how they reinforced the need for workplace safety. These codes were found in all three types of data.

Standard Information

OSHA mandates the baseline information required in occupational health and safety trainings and the DoD can enforce stricter regulations on top of the baseline (Occupational Safety and Health Standards, 1989; Department of Defense, 2007). OSHA regulations do cover specific content that must be included in all trainings. These documents guided the creation of the briefings and served as standards trainings should follow. Many interviewees mentioned that the briefings given during the internship, especially “the exposure limits for the OSHA standards” was what they were “most interested in” (Interview 5, 2013). Another noted, “I didn’t know that standard before so that was a little new” (Interview 1, 2013). In order to comply with OSHA regulations and DoD ESOH risk management, the author purposefully highlighted these standards early on in the briefings to emphasize the importance of understanding the risk of exposure to

each hazard. An interviewee cited that “knowing those exposure limits will help to interpret bio and med group reporting results” as well (Interview 5, 2013). The integration of knowledge from safety trainings with USAF Bioenvironmental Engineering Flight and Public Health Flight reports was a great example of one benefit of emphasizing workplace safety.

Beyond OSHA regulations and standards, Airmen identified these briefings as having content that further explained hazards compared to previous trainings. Interviewee 6.D (2013) noted that the briefing “did a really good job on how [it] broke it down from each topic. I thought that was really easy to take and learn.” This corresponds with the advice given by Walcutt et al. (2013) that information should be delivered in “manageable ... chunks” to help trainees learn the material easier (p.1491). Another mentioned how they learned “what could happen if something were to accidentally go wrong or you’re not following the proper cautions with not wearing your laser eye protection (LEP),” which is a type of personal protective equipment (Interview 6.E, 2013). This turned out to be meaningful for the Airmen because another said, “we know about these problems before but we’ve never had an actual demonstration of what happens when you get zapped in the eye and now we can see that you will burn your retina” (Interview 6.A, 2013). This was in reference to photos in the laser safety training presentation showing the effects of laser injuries on the eye. Injury response was also a highlight of the presentation brought up by an interviewee who said,

“Not only the hazards but also the responses was highlighted in your training, which I think is important to know. Everyone knows if you get hurt to tell someone, but once you take that step about where to go next you let us know to go down to Nellis to get the help from the actual health care physician like an Ophthalmologist. And also we need to talk to our laser safety officer (LSO) we need to find out who that is and get a point of contact for the guys to talk to in

worse case scenario all the way up to the Colonel. So having those things in your slide show helps the guys like myself who might need to have someone come to them and say ‘Hey I hurt myself what do I do’ ... I want to know what to tell them to do” (Interview 6.C, 2013).

Having the additional explanations and injury response information in the safety trainings for these Airmen will improve safety precautions and hopefully “create a safer military” as alluded to by Sleet & Baldwin (2010) who called for increased injury prevention in the military (p. S220).

Lessons Learned

Through the interview process interviewee’s were asked for suggestions for improving future training content. One of the goals of the evaluation of the trainings was to encourage a “dialogue between and among” the Airmen and the Public Health Flight (Roskam, 2001, p. 271). In this dialogue, two main suggestions arose: first, were specific content suggestions, and second, was including videos in the training. Suggestions were given on additional content to include on both trainings briefed. For the formaldehyde training, two of the five interviewees recommending adding more information about “pregnancy issues or reproductive issues” (Interview 1, 2013). The other interviewee gave more insight to the issue saying,

“The health hazards I think they could be expanded on ... There are reproductive repercussions especially in the first trimester ... I think if you know you’re gonna be giving these briefings to other people that should be touched upon. A lot of people don’t think about that” (Interview 4, 2013).

Other suggestions were also provided about the formaldehyde brief. Interviewee 4 (2013) also talked about “more people need to use MSDS’s and know how to do basic cleanup and hazardous waste management to a certain extent.” Training about proper storage and cleanup of hazardous waste was outside of the scope of this training.

However, Airmen should be learning information related to that subject in their mandatory hazard communication training that covers more basics about dealing with chemical hazards in the workplace and how to understand their labels and safety data sheets (Occupational Safety and Health Standards, 1989). Another content suggestion was given about including more information on subtle changes Airmen might expect from hazards.

“I really don’t think there is anything to improve on. I think you covered pretty much everything you could. Maybe you could add something about little bit more potential effects of exposures I think you did describe some asthma type symptoms and things like that. You could maybe go a bit more in depth so that people are even more cognizant of the subtle change they might be experiencing perhaps due to exposure here” (Interview 5, 2013).

Airmen in the laser radiation training also provided the Public Health Flight with some content suggestions and purposed the inclusion of videos in the training. In terms of content, someone suggested, “the only thing I can think of is having the actual unit LSO follow you guys up” so that they could hear their unit specific laser training at the same time as the general safety training required by OSHA and USAF (Interview 6.B, 2013). They were also concerned about the reflection of the lasers and what that danger zone would look like. “So an actual good example of that would be how a laser would reflect off concrete. Because that’s what we mostly deal with is it reflecting off of concrete” (Interview 6.B, 2013). The video suggestions include the topic of danger zones.

“I’m not even sure if you can get footage like that, but for instance you talk about that danger zone of effects of where an aircraft may have a hard time holding that steady. You can actually, if you’re allowed to, use old video that it’s pretty visible while you can see it moving around. That’s the things we look at during our particular jobs. It may not apply to a lot of the other Air Force but to the maintainers ... I’m not sure how in depth you can go in during different jobs, since you go to the whole Air Force, but that would help me personally and probably other people” (Interview 6.C, 2013).

The videos they would like included would be more shop specific and most likely coordinate better with the additional safety training they would get about their aircraft's lasers. Overall, the suggestions offered during the interviews were useful and could help the Public Health flight tailor information in the trainings based on Airmen feedback similar to the study conducted by Hambach et al. (2011) with worker's perceptions of chemical risk in the workplace.

Safety First

The use of personal safety equipment is encouraged or even mandated around occupational hazards by the ESOH risk management plan by the DoD and in OSHA guidelines (Huheey, 2005; Occupational Safety and Health Standards, 1989). The last code under training content focuses on how interviewees perceived their personal protection and safety regarding the hazard on which they were briefed. They discussed safety in terms of it being reinforced through the training or prompting increased enforcement of safety measures in the future.

Interviewees expressed how the hazard content was a refresher or being reinforced, which has been cited in the literature as a positive way to promote safety knowledge and raise continued awareness for proper safety behaviors (Alvarez et al., 2004; Smith-Crowe et al., 2003; Ford & Fisher, 1994). One interviewee noted that the training would "kind of keep you know being cautionary for myself and make sure that the people around me are protecting themselves as well" (Interview 1, 2013). Another laughed and mentioned, "I'm going to be a lot more careful" (Interview 2, 2013). Refreshing the Airmen on the hazards in their workplace is important to remind them that the danger is present every day.

“A lot of the time I think we are out of that safety danger area but with the powerful equipment we have obviously from your slide show we never really get out of that safety danger area. So you kinda gotta always be cognizant of it” (Interview 6.B, 2013).

Knowing how what the proper safety behaviors are also lead to an interviewee feeling “a lot more confident actually. I learned a lot more about different types of laser and affects of lasers in different classes” (Interview 6.D, 2013). It should also promote a readiness to use safety behaviors as mentioned by an interviewee, “it’s just everyday you know you put on your personal protective equipment and go to work doing your routine” (Interview 4, 2013). Increased “self-confidence and willingness to make safety and health improvements” was also cited by Becker & Morawetz (2004) after they used a participatory approach to safety training with the International Chemical Workers Union Council (p. 70).

Remembering that hazards exist and how to properly protect yourself is an important first step. The next step is to ensure that squadron and/or flight supervisors are enforcing these behaviors through the safety climate (Smithe-Crowe et al., 2003; Ford & Fisher, 1994). The laser radiation briefed interview group had a couple of leaders present who affirmed their renewed need for enforcement.

“It’s going to come back down to the fact that we’re more using the laser in the deployed environment so when it comes down to safety precautions we’re gonna have to make sure that people who are doing [their job] need to have their LEP’s if they’re going to be directly in the engagement area” (Interview 6.A, 2013).

“I think some of the work skills I personally picked up on were when we talked about the laser eye protection we do that every day when we are launching aircraft and a lot of people won’t do that. It’s quite a due diligence and they’ll just kinda turn around instead of leaving the safety zone and wearing their protective gear like they’re supposed to. Of course we’re trained not to but seeing the examples of what could happen to you kinda help in my mind make sure I do that next time...So it’s our job to ensure they do, and I think I’ll be a little bit better about

picking them out of the crowd and giving them a talking to if they don't do that" (Interview 6.C, 2013).

The author's observations during the internship shop visits also showed that overall Airmen would try to implement personal protective equipment by having hearing protection available. A particular situation observed did show that a proposed hazard mitigation solution was only partially being implemented. Limitations in the workplace area prevented the solution from being fully implemented. However, overall the Airmen observed were attempting to or carrying out safety measures to the best of their abilities.

Summary

Airmen and a civilian were interviewed about their perceptions of the safety training they received. Interview transcripts along with internship observations and documents formed the basis for interpreting the study data. Two main themes emerged from this data being training process and training content. These themes allowed the author to take a deeper look at how Airmen and the civilian learned, the timeframe of their trainings, the content information, the suggested improvements for the trainings, and their views on personal protection and safety.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

Discussion

According to Roskam (2001), communication is at the root of improving safety trainings. The secondary data analyzed in this study revealed the importance of communicating safety hazards and listening to Airmen perceptions. Two major themes, pedagogy and training content, emerged through the data analysis to elucidate how the Airmen at Nellis and Creech AFBs perceived the effectiveness of the occupational health and safety trainings on which they were briefed.

An examination of the training format revealed a need to update the pedagogy of occupational health and safety training. Airmen appreciated the additional explanations and standards included in the trainings created by the author for the internship. Furthermore, Airmen commented that receiving the training as a briefing was more desirable than just having to read slides or books on their own to understand the safety hazards. The approach taken through the author's internship was focused on providing trainings that were "learner-centered" and the Airmen perceived this as more effective (Vogel-Walcutt et al., 2013, p. 1492).

Knowledge or safety behavior changes were not assessed in this study. However, previous work by Burke et al. (2006) found that providing hands-on or engaging safety trainings did improve worker knowledge of safety and reduce workplace injuries. A future study of occupational health and safety training with Airmen at Nellis and Creech AFBs could further assess the pedagogy process for training. This time going beyond initial perceptions and suggestions for improving training, to actually capture how well

Airmen gain, retain, and utilize the knowledge they learn during occupational health and safety trainings through pre- and post-testing.

Now, let us take a step back from the ‘micro’ or individual Airmen perceptions of the training, and consider the ‘macro’ level of how the greater safety climate and culture of the USAF comes down to the squadron and flight level (Finnegan & Viswanath, 2002). Based on the interviews and observations collected during this study, it became clear that safety was important but budgetary and temporal restraints created an environment where safety training was done quickly, out of necessity. The military thrives on how well trained its personnel are. Technical training is at the heart of the readiness. To further increase readiness, a stronger safety climate and culture should be formed. Smith-Crowe et al. (2003) also found that workplaces with strong safety climates, including management support, could enhance the transfer of safety training knowledge into higher safety performance.

Through encouragement of shop supervisors and flight leadership, occupational health and safety trainings could be briefed to the group to encourage dialogue about hazards and increased awareness of safety behaviors. This approach takes into consideration the preferred training format and learning styles expressed by Airmen in this study. It also necessitates a level of quality assurance in occupational health and safety training. If supervisors are providing the same trainings with explanations annually or as required, it ensures that Airmen are gaining the full benefit of learning and being refreshed on the safety information without having to struggle to understand the material on their own. Taking the time to promote a positive safety climate could help prevent

occupational injuries and “reduce days lost, save money, and preserve our investment in force protection” (Sleet & Baldwin, 2010, p. S220).

Implications

Management support of positive safety culture is essential to a sustained movement towards increased safety behaviors and knowledge. This study did find a couple of supervisors who stated renewed support for enforcement of safety behaviors in the workplace. If their commitment to safety can be replicated and maintained in additional industrial workplaces, it will have key public health implications on the safety culture cultivated at the flight and squadron level. It will encourage Airmen to implement the knowledge and safety behaviors they learn during occupational health and safety training.

Continuing to emphasize the importance of the safety training after the internship will also be imperative. The author’s internship allowed the public health flight to brief Airmen and civilians, however, the reality of budgetary restraints means a member of the USAF Public Health Flight will not likely be the one giving the trainings to Airmen. The Public Health Flight could conduct train the trainer workshops to ensure supervisors feel comfortable briefing their Airmen on their specific workplace hazards. If workplace supervisors or flight/squadron leaders take on this responsibility of demonstrating the significance of occupational safety, then the safety culture can continue to grow and remain strong where it matters most – in the workplace.

The Public Health Flight can support the mission of occupational safety by updating and making effective trainings available to supervisors and/or all Airmen. Based on the suggestions given during this study, Nellis AFB OHS will be able to modify the trainings

created by the author during the internship. Airmen also valued the additional information about OSHA regulations and the other occupational safety trainings should be updated to reflect this as well. Nellis AFB does make all OSHA required trainings available to shop supervisors through a base-wide Sharepoint system. This empowers the supervisors to use already created trainings to brief their Airmen on the hazards specific to their workplace and strengthen the safety climate in the flight or squadron.

Bias and Limitations

This study is not without its biases and limitations. The first bias is that the author created one of the trainings briefed during this study. The participants were still happy to suggest improvements or additions to the trainings. Therefore, despite the trainings being created by the author, Airmen and the civilian were still comfortable providing feedback.

The second limitation is that the study included a small sample size and therefore may not be generalizable beyond Nellis and Creech AFBs. Recruitment was not a part of this study, and the author only completed secondary data analysis on the interviews provided by Nellis AFB OHS. Within the small sample size was only one civilian. The author recognizes that this is an extremely small sample size and may not be representative of other civilians at Nellis and Creech AFBs. A larger study across multiple USAF bases would be necessary to create more generalizable results in the future.

The third limitation is that the interviews provided were short in length. The author believes this could be due to military training of rendering courtesies and rank recognition (737th Training Group AF Basic Military Training, 2011). In basic training, Airmen are taught the seven basic responses which are short in nature (i.e. Yes,

Sir/Ma'am). However, Airmen are not restricted to solely speaking the basic responses in the workplace. In the interviews analyzed for this study it appears the Airmen used basic responses and some especially in the group interview included additional information beyond the basic responses. This did limit the amount of text the author had to analyze from the interviews, but answers across the interviews were similar and this lead the author to believe the information she had access too was adequate.

The final limitation was the timeframe from briefing to interview. Less than a month apart, Nellis AFB conducted interviews analyzed for this study. Due to the schedule and protocol of the Public Health Flight OHS personnel, the interviews were setup in this way to follow their process for data collection. The military environment is more restrictive than typical qualitative studies. However, their process had to be respected to gain access to Airmen perceptions and complete the evaluation for this study.

Conclusion

Utilizing the qualitative case study framework allowed the author to complete an in-depth secondary data analysis for this study. Through the collection of interview, document, and observational data, two major themes emerged: pedagogy and training content. Participants emphasized that the pedagogy of training is especially important to the format and learning styles employed. More engaging trainings that include both verbal and visual styles are best. Interviewees reported meeting the annual training requirements. Trainings turned out to be good refreshers and an opportunity to provide thorough explanation about hazard standards and safety behaviors. Airmen and the

civilian were not afraid to voice suggestions for future improvements, which have been passed along to Nellis AFB Public Health Flight.

From a public health and prevention standpoint, the support for enforcement of supervisors to ensure that Airmen are putting safety first and using proper safety behaviors is extremely important. Moving beyond this study, it is through the support of USAF leadership and Airmen in the industrial workplaces that must continue to sustain and demonstrate the safety knowledge that they learned in the trainings. Their persistent perception of a positive safety culture will be essential. Continuing this dialogue between Airmen and the Public Health Flight will ensure future safety training improvements are effective and foster a strong safety culture. The USAF “must not be afraid to re-examine [the] safety and well-being” of Airmen and civilians with regards to occupational health and safety (Smith, 2002, p. 614).

APPENDIX: USAF RESEARCH DETERMINATION



DEPARTMENT OF THE AIR FORCE
59TH MEDICAL WING (AETC)
JOINT BASE SAN ANTONIO - LACKLAND TEXAS

22 Jul 13

MEMORANDUM FOR: ALEX TURNER, DAF, LSSC, BSPH
Mike O'Callaghan Federal Medical Center
99 AMDS/SGPM
4700 Las Vegas Blvd North
Nellis AFB, NV 89191

FROM: 59th CSPG/SGVUS
Wilford Hall Ambulatory Surgical Center
2200 Bergquist Drive, Bldg. 4430
Lackland AFB, TX 78236-9908

SUBJECT: Research Determination of Public Health Process Improvement Project

1. Based on 45 CFR 46.102(d), research is defined as a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge. Systematically collecting and analyzing data from individuals for the primary intention of preventing or controlling a disease or injury and improving health or improving a public health program or service is not considered research. Likewise, the intention of publishing these results does not necessarily imply the Public Health activity is research, since it is ethically and morally prudent to publish these results in government documents or share results with other Public Health officials.
2. The Public Health process improvement project conducted at Nellis AFB, NV, between 5 Jun and 26 Jul 2013, is considered operational and is not research. If an activity is not considered research, then it does not fall under any legal or regulatory oversight by an Institutional Review Board, based on 21 CFR 50.20 and 45 CFR 46.111. Additionally, the intent to publish these results is also considered non-research, since the proposed distribution is to other Federal and Public Health officials. The proposed publication will require official Air Force clearance through the local MOFMC Public Affairs Office.
3. Should you have further questions concerning this determination, I can be reached at (210) 292-5203/DSN 554-5203 or by e-mail at [rocky.calcote.1@us.af.mil].

Respectively

A handwritten signature in black ink that reads "Rocky Calcote".

ROCKY D. CALCOTE, PhD
Clinical Research Administrator

Partners in a high-performance health system, dedicated to excellence in global care

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VITA

Graduate College
University of Nevada, Las Vegas

Melissa Jo Breunig

Degree:

Bachelor of Science – Natural Sciences with Honors, 2012
University of Wisconsin – Madison

Special Honors and Awards:

California – Nevada Public Health Training Center Stipend Award
(Summer 2013)

Thesis Title: Listening to the Ranks: Perceptions of the U.S. Air Force Occupational
Health and Safety Training

Thesis Examination Committee:

Chairperson, Carolee Dodge-Francis, Ed.D.
Committee Member, Shawn L. Gerstenberger, Ph.D.
Committee Member, Jennifer R. Pharr, Ph.D.
Graduate Faculty Representative, Russell T. Hurlburt, Ph.D.