

Listening to the Ranks: U.S. Air Force Perceptions Regarding Health & Safety Trainings

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ABSTRACT

Occupational health and safety hazards are abundant in military environments. Injuries remain a public health concern in the United States military because of the hazardous occupational settings. Public health is critically related to injury reduction by addressing the need for comprehensive safety education training and specifically regarding exposure-related injuries training. This qualitative bound case study examined the perceived effectiveness of occupational health and safety training programs among Airmen at southwest Air Force bases. A secondary data analysis was completed using communication theory to analyze 13 qualitative interviews. Interviews were conducted with Airmen to examine their perceptions of the occupational health and safety training conducted at two southwest Air Force bases. Pedagogy and training content were the main themes that emerged from these interviews. This study's results highlight the gap in the literature regarding United States Air Force occupational health and safety education training driven by Airmen articulating their perceived effectiveness of training.

Keywords: military, Air Force, occupational health and safety, injury prevention

INTRODUCTION

The importance of preventing military occupational exposures has not been recognized until recent years (Gaydos, 2011). U.S. military job-related injuries remain among the most unrecognized problems facing the military, which may lead to under-estimation of injuries (Amoroso, Bell, Baker, & Senier, 2012). Service members are ordered to work in diverse occupational environments handling

hazardous materials, maintenance, or in contaminated areas (Gaydos, 2011). These environments can dramatically increase their risk of injury resulting from occupational exposure on any installation where U.S. military personnel are stationed, as well as during deployments. (Amoroso, et al., 2012). Successful injury prevention necessitates the public health approaches of modifying behaviors and looking to reduce exposure. Education is one successful strategy utilized to promote these changes (Sleet & Moffett, 2009). The focus of this study is occupational health and safety education, specifically education surrounding chemical and laser safety.

Military Occupational Health and Safety

The Occupational Safety and Health Act (OSHA) of 1970 and subsequent legislation made employers responsible for protecting their workers from harmful exposures and accordingly required employers to provide their workers with safe and healthful workplaces and to ensure the development and implementation of meaningful workplace standards. These laws' specified protections were implemented much earlier for civilian employees than for members of the military. Regarding military personnel working non-combat jobs similar to other civilian workers, the military needs to address hazardous working conditions just as work conditions are monitored for non-federal civilian employees (Deeter & Ruff, 1993). This legislation initially exempted federal employees, although some federal workers performed industrial tasks comparable to non-federal employees. The Occupational Safety and Health Act was amended in 1980 to require safe working environments and education programs for military and civilian Department of Defense (DoD) employees (Deeter & Ruff, 1993). This is the first time the U.S. federal government prioritized military personnel's occupational safety and health (Gaydos, 2011).

The U.S. Army still reported 8.7 percent of all the injury hospitalizations from 1980 to 2002 were caused by poisons, fire, and hot/corrosive substances even with workplace regulations (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). These injury reports demonstrate a need for improved chemical safety among military personnel.

Beyond chemical injuries, military applications of lasers have expanded in recent years

and pose a real hazard to military personnel (Whitmer & Stuck, 2009). From 1965 to 2002 there were 29 reported military laser injuries (Clark, Johnson, & Neal, 2004). 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). 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).

Communication Theory

Communication between health and safety officials and workers is at the root of improving safety trainings and work environments (Rosskam, 2001). A communication theory framework can be used to better understand how audiences’ view the messages they receive and to gain a perspective on how communication can be used more effectively (Finnegan & Viswanath, 2002). A major area of communication study include is media effects. 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. How individuals or groups consider risk communication can influence occupational health and safety outcomes. 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). 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 the USAF’s occupational health and safety education training. This case study focuses on education because it can affect behavioral change through primary prevention methods (Karmis, 2001). 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. 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. Vogel-Walcutt, Fiorella, & Malone (2013) have considered varying instructional methods as a framework for improving military training systems based on academic learning. 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). 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 and presented in a format that is familiar to trainees (Vogel-Walcutt et al., 2013). 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 of 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 meaningful and effective

occupational safety education training using empowering and participatory approaches.

Research using the participatory approach connects to the communication framework by encouraging a “dialogue between and among educators and workers” (Rosskam, 2001, p. 271). A study conducted by Hambach, et al. (2011) 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., 2011). Becker and Morawetz (2004) also discovered that workers had higher “self-confidence and willingness to make safety and health improvements” after using participatory training methods (Becker & Morawetz, 2004, p. 70). Hands-on or engaging safety trainings were 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.

Meaningful and effective use of occupational safety training among military personnel has implications for force readiness and training. In order to have highly effective training, the varying contexts that influence the training must be considered. Alvarez, Salas, & Garofano (2004) and Cannon-Bowers, Salas, Tannenbaum, & Mathieu (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). The major components of the IMTEE include “training content and design, changes in learners, and organizational payoffs” (p. 393). This case 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.

Purpose of Study

To date, there is limited research that has examined USAF occupational health and safety education among Airmen using a qualitative design. Therefore, the purpose of this case study is to examine Airmen’s perception of the effectiveness of the occupational health and safety education programs conducted at southwest Air Force bases (AFBs) regarding improving safety education comprehension.

METHODS

The following sections present an overview of the study research methodology and an internship that paved the way for this qualitative case study of Airmen at two southwest Air Force bases (AFBs)

Access to Airmen

This study was made possible through an internship agreement between a southwest AFB and the University of Nevada, Las Vegas. One research member was an intern who worked with the Occupational Health Section (OHS) of the Public Health Flight (a sub-organization of the Aerospace Medicine Squadron). The purpose of the internship was to improve the process of occupational health hazard and safety training programs at the two AFBs by updating training requirements, procedures, and policies for the 167 industrial workplaces. This was achieved through two objectives. The first objective was to learn the occupational health process encompassing workplace safety, industrial hygiene, and medical surveillance. 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.

Five industrial workplace site visits were conducted to provide live field experience of workplace operations and hazard mitigation. These visits and data collected from the training matrix informed the creation of training presentations on the top five hazards at the southwest AFBs, plus two additional hazards (Table 1). Seven occupational health and safety training presentations were created; two were briefed in July 2013 to one squadron each at the southwest AFBs (Table 1). Laser radiation safety training could not be created due to USAF restrictions.

Table 1
Training Format by Hazard Time

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

Note. X denotes how the hazard was addressed.

Research Methods

This study used a qualitative bound instrumental case study format including 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). Bounding a case is often used to clarify who, what, or where the case is restricted (Elger, 2010). This case study was bound to Airmen at two southwest AFBs. Case study methodology facilitated the in-depth examination of Airmen’s perception of the effectiveness of USAF occupational health and safety education training at southwest AFBs. This methodology particularly allowed this study to examine “how” Airmen perceived their experiences with occupational health and safety training and “why” it was effective—or ineffective. This study also used 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). It is an instrumental case study because Airmen at the southwest AFBs offered insight into job-related issues and expressed their perceptions and experiences related to occupational health and safety training.

Communication theory informed this research’s methodology. This research examined the perceptions of Airmen who explained how occupational health and safety education training (i.e., communication) affected their comprehension of training material. This study commenced analysis at the individual level (i.e., individual Airmen’s perceptions) and proceeded to identify USAF culture’s effect on occupational health and safety

education through Airmen’s comments and the researcher’s observations.

Two institutional review boards were obtained for this study. The USAF provided a research determination letter approving the study, as well as an UNLV IRB (Protocol # 1307-4510). This study is a secondary data analysis because OHS personnel at a southwest AFB conducted all interviews, de-identified the information, and then provided it to the researchers. Therefore, the researchers were dependent on the OHS personnel 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 southwest AFB who attended an occupational health briefing completed during the internship (Table 1). Exclusion criteria included Airmen at either southwest AFB who did not attend a briefing apart of the internship.

Data Collection

The occupational health improvement project completed was not evaluated during the internship experience. The Public Health Flight at the southwest AFB pursued the evaluation of the training presentations in a collaborative effort with the researchers to analyze the data. This study utilized observations, interview content, and documents to examine Airmen’s perceptions and experiences of occupational health and safety training. The internship provided observational and documentation data about USAF and OSHA standards related to the occupational health and safety trainings. The OHS personnel in the Public Health Flight at a southwest AFB went on to collect interview data.

Observations

Airmen were observed at five industrial worksites during site visits to monitor compliance with safety standards. The field visits allowed the researcher 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 researcher’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 researcher made field observations over nine weeks as a nonparticipant or observer;

observations were recorded after work site visits as weekly journal entries. Use of three observation modes permitted triangulation of data during subsequent analysis.

Interviews

Occupational Health Section (OHS) personnel from a southwest AFB conducted semi-structured interviews examining Airmen’s perspective on occupational health. One person from OHS conducted interviews on two occasions in early August 2013 with Airmen from two squadrons within the southwest region. Airmen from one squadron were interviewed individually; Airmen from the other squadron were interviewed as a group in order to encourage greater communication. OHS personnel decided on this change to the interview protocol because the initial interviews were shorter than expected; however, the initial interviews provided valuable information. In a normal setting, this change of interview style could have lead to bias in how information was captured. However, the military group setting encouraged Airmen to expand on their perceptions beyond basic military response. Interviews’ duration was 10–20 minutes.

Purposive sampling was used; eligible Airmen were in a squadron that had received occupational health training briefings and were willing to participate in an audio-recorded interview. Table 2 presents participants’ demographic information. OHS personnel provided no other demographic or indentifying information about interviewees. Therefore, additional conclusions based on educational attainment of personnel by rank cannot be made.

Table 2
Participant Demographics

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

OHS personnel used eight open-ended questions to examine the effectiveness of occupational health

and safety training conducted at southwest AFBs. The eight questions that follow were used to address Airmen’s learning styles, training format, training’s relevance to duty requirements, and possible improvements to the current training course.

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 researchers further coded the

transcripts to protect the identity of Airmen or civilians in the squadrons from being identified by their rank and/or gender.

Documents

The final data collection method involved occupational safety regulations and guidelines from NIOSH, OSHA, and USAF. Knowledge was acquired 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 Analysis

Data were coded and visually represented in order to identify connections between coded data (Creswell, 2013; Miles & Huberman, 1994). A funneling approach for data organization was utilized to narrow the nine original codes and identify major themes. This method allowed the researchers to categories data codes' and themes' based on relevance to the occupational health and safety training context. Inter-coder agreement was monitored to protect the data's reliability; there was 90% agreement and the coding differences were resolved through consensus agreement between the two coders (Miles & Huberman, 1994; Schreier, 2012).

RESULTS

Themes were extracted from secondary analysis of interview, observational, and document data based on groupings of data codes present in each data format. Major extracted themes were pedagogy and training content. Each theme was associated with three codes; these are described below.

Pedagogy

The term "pedagogy" refers to the art, science, or profession of teaching (Pedagogy, 2012). This theme captured how occupational health and safety training was conducted, how airmen learn best, and the timeframe for training occurrence. Current training format, learning style, and time were subthemes found in all data associated with this theme.

Current training format. This subtheme captured Airmen's description of how adequately the

training fit their needs. Consideration of training format affected Airmen's perception of their understanding and mastery of training content.

The Airmen discussed the difference between receiving training in a briefing format versus completing training individually with books or PowerPoint slides. Selected interviewee comments are as follows. "[It's good 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" (Interview 6.A, 2013). "[The] other training had the same content but ... it was just a on a piece of paper and not as interactive [as the briefing]" (Interview 5, 2013). "[The briefing] forced you to pay attention... more" (Interview 6.C, 2013). These comments indicate that in-person briefings allowed the Airmen to ask questions in order to better understand complicated material and standards relating to daily duties and shop-specific situations. In general, the briefing format's greater interactivity seemed to benefit the Airmen by increasing attention paid to training content and promoting understanding.

Learning style. Occupational health and safety training's mode of presentation affects the "central process of learning" (Burke et al., 2007, p. 236). This subtheme captured how training style interacted with the Airmen's various learning styles.

Various Airmen reported visual, auditory, and tactile learning styles. Using "learner-centered" training formats that accommodate specific learning styles promotes learning (Volgel-Walcutt et al., 2013, p. 1492). Selected interviewee comments are as follows: "it was nice to be able to see it on the screen and hear it as well" (Interview 1, 2013). "[I] 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" (a self-described visual learner; Interview 6.H, 2013). Other interviewees commented that explanations including pictures helped them to understand training content presented using diagrams (Interview 6.D, 2013). Training attempted to accommodate visual and auditory learners in order to better reach a broader set of Airmen.

Time matters. Occupational health and safety training programs are subject to requirements that stipulate how often workers must be trained and refreshed on the trained subject (Occupational Safety and Health Standards, 1989; Department of Defense, 2007). In five of the interviews conducted with military personnel, interviewees indicated 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, 1989; Department of Defense, 2007). The participating civilian indicated not having received recent safety training but indicated understanding the program's content as a consequence of having been "through it several times" (Interview 4, 2013).

Annual training is important partly to review or refresh training content (Occupational Safety and Health Standards, 1989; Department of Defense, 2007). Several interviewees' comments reflected this: "it was just a review" (Interview 1, 2013); "Pretty much, it just told me what I already knew" (Interview 3, 2013); "It was just a refresher" (Interview 4, 2013). Training should help establish a need for safety in the workplace; an interviewee's comments reflected this: "It's a refresher to ensure that I keep myself and my staff safe back there in our work section" (Interview 5, 2013). OHS personnel were able to clarify training requirements at the time of the interview; interviewees expressed gratitude for time spent training the group on one of their prominent occupational hazards.

Training Content

The theme "training content" captured information presented in the occupational health and safety training, the suggested improvements that could be made to the training, and training's reinforcement of the need for workplace safety. Standard information, lessons learned, safety first and education as injury prevention were subthemes found in all data associated with this theme.

Standard information. Risk management was deliberately highlighted early in briefings to convey the importance of understanding each hazard's exposure risk; this was necessary in order to comply with OSHA regulations and DoD Environment, Safety, and Occupational Health (ESOH) requirements. The following interviewee comment aligned with this subtheme: "Knowing those exposure limits will help to interpret bio and med group reporting results" (Interview 5, 2013). The integration of safety training content with USAF Bioenvironmental Engineering Flight and Public Health Flight reports illustrated a key benefit of emphasizing workplace safety.

Airmen indicated that the risk management briefings further explained hazards compared with previous training. 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 Walcutt et al.'s recommendation that information should be delivered in "manageable ... chunks" to

help trainees master the content (2013, p.1491). Another interviewee mentioned learning "what could happen if something were to accidentally go wrong or you're not following the proper precautions with... wearing your laser eye protection" (LEP; a type of personal protective equipment; Interview 6.E, 2013). "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).

Lessons learned. The training aimed to encourage dialogue between the Airmen and the Public Health Flight. In this dialogue, interviewees suggested including video content in training and made a range of specific content suggestions. Regarding formaldehyde training, an interviewee suggested addressing hazardous materials' relationship with "pregnancy or reproductive issues" (Interview 1, 2013). Interviewee 4 (2013) commented further on this issue:

The health hazards that I think 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.

Also regarding formaldehyde training, interviewee 4 (2013) stated "more people need to use Material Data Sheets (MSDSs) and know how to do basic cleanup and hazardous waste management to a certain extent." The proper storage and cleanup of hazardous waste was outside of the scope of this training; mandatory hazard communication training addresses basic management of chemical hazards (Occupational Safety and Health Standards, 1989). Interviewees also suggested describing subtle bodily changes Airmen could expect from exposure to hazardous materials.

Airmen attending laser radiation training provided the Public Health Flight with content suggestions and suggested including videos in the training; they were concerned with the reflection of 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).

Interviewees suggested that the videos included in training should be more shop-specific and would likely improve the shop's organization between additional aircraft laser safety training.

Overall, Airmen's suggestions were useful and might help the Public Health Flight tailor training content.

Safety first. Use of personal safety equipment around occupational hazards is encouraged and mandated by the ESOH risk management plan, by the DoD and in OSHA guidelines (Huheey, 2005; Occupational Safety and Health Standards, 1989). This subtheme captures interviewees' perception of their personal protection and safety regarding briefed hazards; it discusses reinforcing the need for safety through training and prompting.

Interviewees stated that how hazard-related training content refreshed and reinforced their existing knowledge; this teaching method promotes safety knowledge and maintenance of safety behaviors (Alavrez et al., 2004; Ford & Fisher, 1994; Smith-Crowe et al., 2003). An interviewee commented, "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" (Interview 6.B, 2013). Refreshing Airmen's existing knowledge of workplace hazards promotes their safety.

Becker and Morawetz proposed that increased "self-confidence and willingness to make safety and health improvements" promotes safety (2004). Interviewees who had received the laser radiation safety briefing affirmed their renewed need for enforcement. Interviewee 6.C (2013) stated the following:

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 kind of 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 helps in my mind to 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.

Education as injury prevention. Matching cognitive style with instructional methods importantly promotes learning. Military training is highly focused on learning; however, budgetary constraints require training to be quick and

inexpensive as well as effective (Vogel-Walcutt et al., 2013). Multimedia presentations present information using both visual and auditory cues, thereby addressing a range of learning styles.

It is in the military's interest to keep training "learner-centered" and consistent with personnel's cognitive styles (Vogel-Walcutt et al., 2013, p. 1492). Dominant cognitive style is likely to vary between personnel; therefore, training should use a combination of presentation methods to accommodate a range of learning styles. Multimedia presentations that use pictures and words promote learning, particularly if the presented text is read aloud by a trainer who emphasizes its importance. This mode of presentation highlights the training's key concepts and allows personalization of content (Vogel-Walcutt et al., 2013). Finally, complex information should be broken down into manageable components and presented in a format that trainees find familiar (Vogel-Walcutt et al., 2013). Implementing instructional methods that reflect military personnel's learning style will increase training's effectiveness.

DISCUSSION

Airmen and a civilian were interviewed regarding their perceptions of safety training they had received. Interview transcripts, internship observations, and regulatory documents were collected. Pedagogy and training content were major themes extracted through data analysis; these themes captured the perceptions of Airmen at southwest AFBs regarding effectiveness of received occupational health and safety training. Airmen made suggestions regarding reforms to the training's structure and content; these were also recorded and analyzed. Communication is key to improving safety training. Secondary data collected in this study indicate the importance of communicating safety hazards and listening to Airmen's perceptions.

Analysis of the collected data responses for training format indicated that updating the pedagogy of occupational health and safety training would improve training outcomes. Airmen commented that receiving the training as a briefing was more effective than their previous experiences receiving independently self-administered reading material. 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 USAF bases could further assess the pedagogy process for training by capturing

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

The collected data responses indicated that budget and time constraints require safety training to be completed quickly. Increased collective prioritization of safety would increase Airmen's safety. Workplaces that highly prioritize safety, including through management, more effectively use safety training content to increase safety (Smith-Crowe et al., 2003).

Trainers may use the briefing format to deliver occupational health and safety training in order to promote dialogue about hazards and increase trainees' awareness of safety behaviors. Airmen expressed that they preferred training delivered using the briefing format; additionally, this format more flexibly accommodates a range of learning styles and facilitates assessment of training quality. Standardized training and explanation structures can ensure that briefings maximally benefit Airmen's mastery and retention of new and refreshed content. Promoting the prioritization of safety will diminish the rate of occupational injuries, "reduce days lost, save money, and preserve our investment in force protection" (Sleet & Baldwin, 2010, p. S220).

Bias and Limitations

This study has the following limitations and may have the following biases. The southwest AFBs only setup two safety training briefings limiting the possible pool of participants to a small number. This increases the likelihood that the sample did not represent the population of Airmen at southwest AFBs and diminishes the present results' generalizability to other contexts. Particularly, the sample contained only one civilian, reducing the likelihood that the present results represent other civilians at southwest AFBs. Future research should examine larger selection of USAF bases to obtain more generalizable results.

Additionally, the interviews' duration was short; this may have been due to military training regarding rendering courtesies and rank recognition (737th Training Group AF Basic Military Training, 2011). In interviews, Airmen used basic responses, especially in the individual interviews.

Finally, the timeframe from briefing to interview was not ideal. Southwest AFB required that the present interviews were conducted less than one month apart. The military environment is more restrictive than those typically analyzed in qualitative studies; however, this timeframe was necessary in order to interview the participants.

Conclusion

This study used a qualitative case study methodology; this allowed thorough secondary data analysis. Pedagogy and training content were extracted as major themes from three forms of data including: qualitative semi-structured interviews, documents that guided safety training regulation, and observing Airmen in their workplaces. Regarding pedagogy, participants considered it important that training's format effectively engage with a range of learning styles. Participants preferred training that included auditory and visual content because it was more engaging. Participants made suggestions for further improving existing training content; these have been delivered to the southwest AFB Public Health Flight.

The secondary data analyzed in this study indicated that effectively communicating safety hazards and listening to Airmen's perceptions of safety training has the potential to critically improve Airmen's safety. Future research should examine occupational health and safety training among Airmen at a large number of USAF bases in order to obtain more robust data; this would help to identify additional opportunities for improvement. Administrators should increase AFB personnel's prioritization of safety; further engagement between Airmen and the Public Health Flight will lead to further improvements of safety training.

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