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THE ENVIRONMENTAL HEALTH AND SAFETY LEADERS' PERSPECTIVES OF HIGHER EDUCATION SAFETY CULTURE

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DEDICATION

I dedicate my dissertation to our mother, Askale Jaba, and the four pillars of our communities: Shitaye Sahle, Zeni Fikre, Hailu Gizaw, and Worku Shumneka.

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Abstract

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To safeguard the health and well-being of faculty, students, staff, and the community is of moral imperative for higher education institutions. Likewise, protecting the environment is a socially sound practice. Furthermore, building and maintaining a positive safety culture is believed to contribute to productive environmental health and safety (EH&S) outcomes. Higher education EH&S leaders are at the center of universities' efforts in maintaining a positive safety culture. The purpose of this inquiry was to study higher education EH&S leaders' perspectives on safety culture and contribute to closing the academic literature gap in the higher education setting. Interviews and a survey were the data collection techniques. EH&S leaders of U.S. higher education institutions participated in the study.

I used Cooper's (2000, 2016) reciprocal safety culture model as a theoretical framework and a mixed methods research design to find answers to the research questions. The survey results revealed how EH&S leaders viewed different aspects of their operations, and findings from the interviews revealed the leaders' lived experiences. For example, the quantitative study showed 100% of the participants *strongly agree* or *agree* that shaping the safety culture of their campus is part of their role. In addition, the qualitative data identified distinct strategies employed by leaders to shape the safety culture of their campuses.

Four major themes were identified in the qualitative data. In the first theme, The Higher Education Safety Culture, the EH&S leaders reflected on their lived experiences and the importance of positive safety culture in accomplishing their goals. They mobilize their campus communities in a collective effort to achieve a healthy and safe working environment, minimize the impact on the environment, and remain compliant with regulatory requirements. The second theme, Higher Education Environmental Health and Safety Programs, stressed the plans and procedures the leaders and their departments engage in their daily operations. The third theme, Higher Education Management's Role in Environmental Health and Safety Operations, manifested the leaders' equivocal voice on the necessity of the higher education leadership and upper management support to fulfill their missions. The last theme, Modus Operandi of Higher Education Environmental Health and Safety Leaders, is about a range of strategies and tactics the EH&S leaders employed to succeed in a structured, bureaucratic, and challenging environment.

The findings have direct implications for both higher education EH&S professionals and higher education senior leadership. The study findings implied EH&S leaders should focus their effort where it generates the best outcome, namely: (a) orchestrate the campus community toward a positive safety; (b) build and implement effective EH&S programs; (c) bring upper management and leadership aboard; (d) apply effective communication; (e) build trust; (f) define their role as a consultant; (g) stand out; and (h) create a brand, motto, and slogan where possible.

For higher education senior leadership, participants emphasized the necessity of upper management and leadership support to build and maintain a positive safety culture on the campus, agreeing with Cooper (2000, 2016). This work helps contribute to making higher education senior leadership and upper management understand their role in their campuses' safety culture and provide due support and actively participate.

This study served as an initial exploration in understanding higher education EH&S leaders' perspectives on safety culture and contributing to closing the literature gap. It also opened a door for future research. Broadening the audience to students, faculty, and staff are reasonable candidates for further research for a more comprehensive understanding of the safety culture in higher education. In addition, expanding the survey to include more EH&S leaders of higher education will elaborate on the EH&S operations, challenges, and sentiment.

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CHAPTER 1: INTRODUCTION

Higher Education Environmental Health and Safety

In any organization, including institutions of higher learning, there is a real risk of injury and illness from one or more of the following hazards: (a) electricity, (b) heat, (c) power tools, (d) compressed gasses, (e) confined spaces, (f) hazardous chemicals, (g) radioactive materials, (h) bloodborne pathogens, (i) laser, (j) natural disasters, (k) active shooter incidents, (l) trip-and-fall hazards, (m) infectious substances, and more (Ménard & Trant, 2020). Friend and Kohn (2018) defined safety as "operating within an acceptable or low probability of risk associated with conditions or activities having the potential to cause harm to people, equipment, facilities or the enterprise" (p. 9). Managing health and safety hazards to an acceptable risk level is a challenge for any organization, as evident in one of California's public higher education institutions.

On December 29, 2008, a terrible accident happened in a University of California, Los Angeles (UCLA) chemistry lab (Ménard & Trant, 2020). A staff researcher's clothes caught fire when a pyrophoric chemical generated fire and burned the student (Gibson et al., 2014). The student was not wearing adequate personal protective equipment (PPE). The student died 18 days after the accident (Skvorc & Wilson, 2015). The result of an incident investigation by the California Occupational Safety and Health Administration (Cal/OSHA) revealed multiple lab safety violations that led to the accident. Cal/OSHA fined the university $31,875 (Kemsley, 2018). Criminal charges were brought against the University of California and the principal investigator for violating OSHA regulations. Both criminal charges were settled later, separately. University of California agreed to endow a $500,000 scholarship in the victim's name and spent $4.5 million in legal fees (Skvorc & Wilson, 2015).

Reducing accidents and injuries helps reduce costs to the university system, thereby allowing officials to direct funds toward teaching and learning. For any responsible organization, safeguarding the health and well-being of employees and the public and protecting the environment are socially sound and economically beneficial acts. Productivity improves when employees feel safe (Cooper, 2016; Fairfax, 2020; Goetsch, 2019). Organizations are not alone when dealing with their responsibility to keep their operations healthy and safe. Federal, state, and local agencies enforce rules, regulations, policies, and guidelines intended to protect workers, the public, and the environment. Other organizations provide advisory, educational, and research support to create a healthy and safe working environment. The Occupational Health and Safety Administration (OSHA), the Chemical Safety and Hazard Investigation Board, National Advisory Committee on Occupational Safety and Health, National Institute for Occupational Safety and Health, Mine Safety and Health Administration, Environmental Protection Agency, Nuclear Regulatory Commission, and Centers for Disease Control (CDC) are some examples. Some of these agencies work with universities for different purposes. For example, the CDC granted $3.7 million to UCLA's study on the effectiveness of PPE against COVID-19 among emergency department workers in 2020 (Rivero, 2020), and $4.9 million to study the efficacy of vaccines among health workers (Rivero, 2021).

Environmental health and safety (EH&S) involves a wide range of activities. As described by Barton and Shan (2017), "Safety encompasses a large swath of tasks, and it has tentacles that stretches into every aspect of manufacturing and research" (p. 32). Depending on each university campus' needs, the EH&S department develops and maintains a long list of written EH&S programs. Common safety programs include the (a) chemical hygiene program, (b) hazard communication program, (c) hazardous material management program, (d) hazardous

waste management program, (e) emergency action plan, (f) bloodborne pathogen program, (g) fall protection program, and (h) radiation safety program (Barton & Shan, 2017).

Bloodborne Pathogens Program (BBP) is one example of a health and safety program. The program includes most of the components required in the BBP standards 8CCR5193 and 29 CFR 1910.1030. The BBP standard covers the requirements of organizations with the risk of exposure to bloodborne pathogens and other potentially infectious materials in their operations. The standard addresses (a) exposure determination, (b) engineering controls, (c) work practice controls, (d) hepatitis B vaccinations, (e) hygiene, (f) communication, and (g) training. Bloodborne pathogens are defined in 8CCR5193 as "pathogenic microorganisms present in human blood and can cause disease in humans. These pathogens that cause infection and spread include, but are not limited to, hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV)" (California Code of Regulations, 1991a, para. b). BBP can be transmitted through the mouth, nose, and eyes like SARS-CoV-2, the virus that causes COVID-19 (Mitchell, n.d.).

Infection control was of particular interest in this study because of SARS-CoV-2. COVID-19 was used in discussions about EH&S programs. Who could have predicted witnessing a pandemic with such enormous consequences? The COVID-19 global pandemic dramatically altered world order and changed the way of life of almost everyone on earth. No one was ready for the pandemic. Many universities were closed for most of 2020 and 2021, and distance learning became the new norm. Figure 1 shows new cases of COVID-19 infection in the 10 most-affected countries as tracked by John Hopkins University in 2020 and 2021 (Johns Hopkins University and Medicine, n.d.).

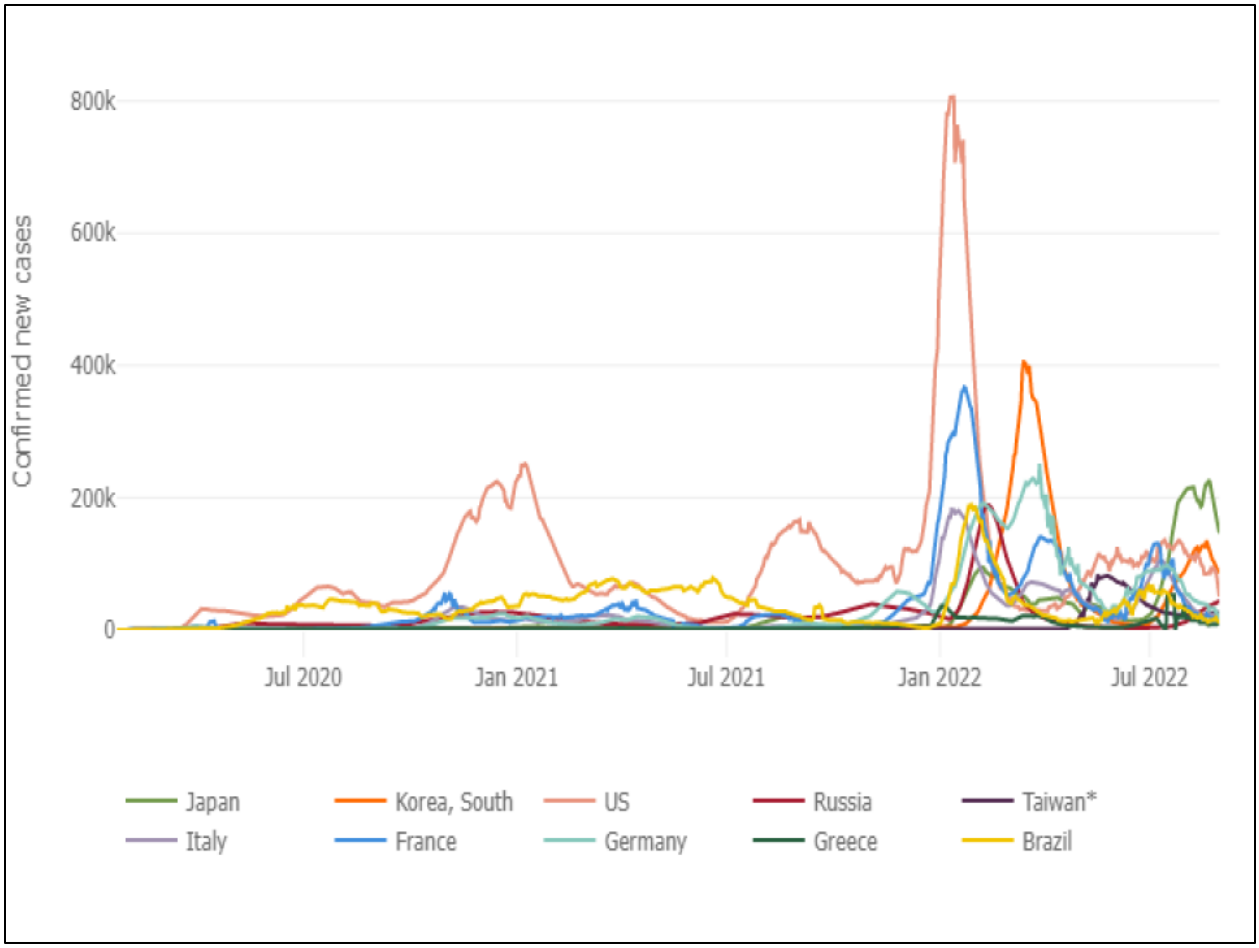

Figure 1. COVID-19 daily confirmed new cases for 10 most affected countries.

Organizational personnel prepare for and respond to accidents, injuries, disasters, or in rare cases, infectious diseases like COVID-19; however, the tools available to EH&S professionals to assess and mitigate a phenomenon like the COVID-19 global pandemic were particularly challenging (Zisook et al., 2020). This inquiry attempted to understand the response by higher education campus officials to the pandemic and the role of health and safety leaders in the process as part of the safety culture study.

Problem of Practice

The EH&S programs at higher education institutions are intended to minimize the risk of injury, illness, accident, liability, and reduce negative impacts on the environment. Effective EH&S programs also help reduce EH&S-related costs and keep campuses compliant with regulations. Cooper (2000) posited safety program outcomes depend on an organization's safety culture. EH&S has a crucial role in ensuring health and safety on campuses and there is a need to understand more about how to foster a positive safety culture on campuses. This study attempted to describe the roles of health and safety leaders in shaping the safety culture of higher education and the effects of safety culture on health and safety program outcomes where literature in this setting is scarce.

Purpose Statement

The purpose of this inquiry was to study higher education health and safety leaders' perspectives on safety culture in U.S. higher education institutions.

Research Questions

The following research questions guided the investigation of the perspectives of EH&S leaders on safety culture and the relationship between safety culture and health and safety program outcomes in a higher education setting.

1. How do EH&S leaders shape the safety culture of higher education?
2. How do EH&S leaders of higher education explain the effect of the safety culture of higher education on health and safety program outcomes?

Significance

Higher education institutions' EH&S departments support their campuses by providing consulting, training, auditing, compliance with regulatory requirements, and other services. According to Cooper (2000, 2016), organizations must nurture a positive safety culture to

achieve measurable health and safety program outcomes. EH&S leaders' perspectives provided insight into the role of the safety culture on campus health and safety program outcomes. This knowledge may be helpful in developing a positive safety culture in higher education institutions. In addition, the inquiry contributed to academic literature and may help improve the effectiveness of higher education's health and safety operations.

Theoretical Framework

Safety culture gained prominence after the Chernobyl nuclear disaster in 1986 (Cooper, 2018; Guldenmund, 2018). The safety culture concept was widely used in high-risk industries and low-risk organizations to make the workplace safe (Cooper, 2018). Safety culture is a subculture of an organization (Cooper, 2018; Guldenmund, 2018). The safety culture theory advocated by Cooper (2000) guided this inquiry. Cooper's reciprocal safety culture model described how safety culture should be understood, interpreted, assessed, and evaluated. Safety culture is not a standalone phenomenon operating in a vacuum; rather, it is affected by other activities and affects others (Cooper, 2002). The dynamic relationship between safety culture, EH&S leaders, EH&S programs, EH&S activities, and EH&S outcomes is illustrated in Figure 2, adapted from the business process model of safety culture (Cooper, 2016). Chapter 2 goes into more detail about the safety culture construct.

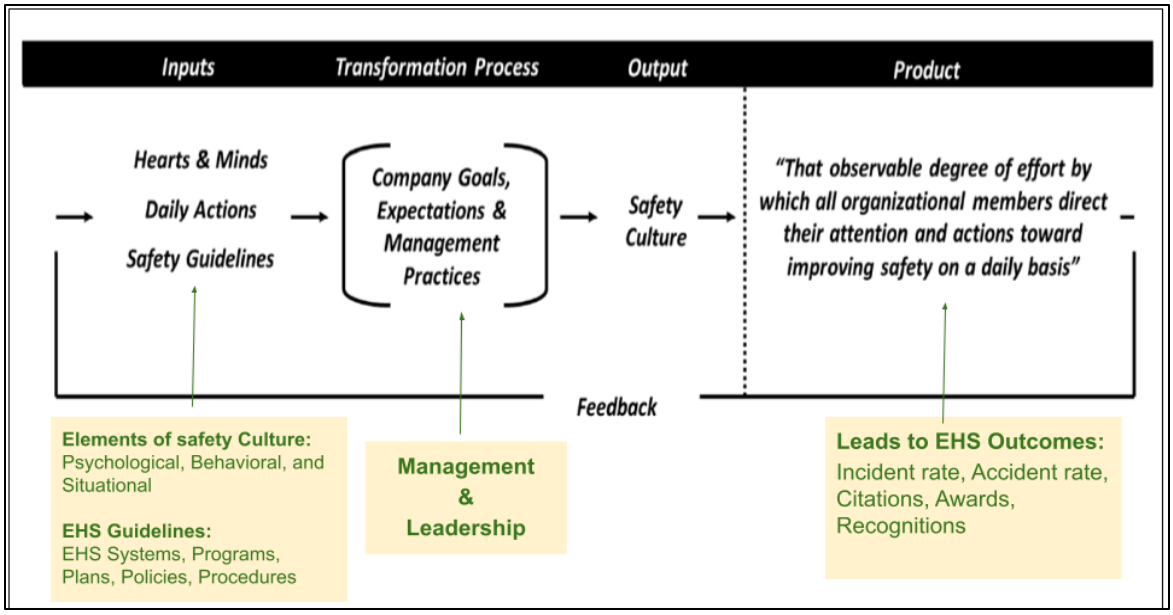

Figure 2. Business process model of safety culture.

Research Design

The study followed a mixed methods research design. Mixed methods research methodology applies both qualitative and quantitative data (Creswell & Creswell, 2017). Convergent mixed method design (QUAL+quan) was used for mixing. I chose a mixed methods research design because I believe in a pragmatic approach to problem solving and I was convinced both survey and interviews would provide better answers to the research questions than any single method. EH&S leaders of higher education in the United States were interviewed and surveyed. Chapter 3 describes the methodology in more detail.

Summary

Higher education EH&S leaders are tasked to keep their campus community healthy and safe, to contribute to minimizing the impact of campus activity on the environment, and to help keep their campus in compliance with regulatory requirements, together with other stakeholders in their institutions. This study aimed to understand the perspectives of these EH&S leaders with

their roles in shaping their institution's safety culture and the effect of safety culture on health and safety program outcomes. Mixed methods research design was used in the study. Cooper's (2000) reciprocal safety culture model guided the study. In the next chapter, literature on the theoretical framework and relevant topics is presented.

CHAPTER 2: LITERATURE REVIEW

Introduction

The purpose of this inquiry was to study higher education health and safety leaders' perspectives on safety culture in U.S. higher education institutions. The following research questions guided the inquiry:

1. How do EH&S leaders shape the safety culture of higher education?
2. How do EH&S leaders of higher education explain the effect of the safety culture of higher education on health and safety program outcomes?

The health and safety of students, faculty, and staff are the most critical factors in fulfilling higher education's teaching and learning objectives. Environmental health and safety (EH&S) departments provide consulting and support to all campus departments, giving special attention to the most vulnerable areas or departments with potential physical, chemical, biological, or other types of hazards. EH&S professionals are tasked to fulfill this obligation in cooperation with higher education management, leadership, and other stakeholders with respect to the campus environment, health, and safety. The EH&S profession is complex and faces continuous change. According to Goetsch (2019), some reasons for these changes are (a) new hazards, (b) new regulations, (c) productivity, (d) workers' compensation cost increases, (e) environmental groups, (f) ethics and corporate responsibility, (g) professionalization of health and safety occupations, (h) increased pressure from labor organizations and employees in general, (i) litigation, and (j) increased incidents of workplace violence.

The first section of this chapter reviews existing literature on environmental health and safety. The subsections include: (a) the Occupational Safety and Health Administration (OSHA), and (b) the Environmental Protection Agency (EPA), (c) The EH&S Profession, (d)

EH&S-related potential risks, and (e) the hierarchy of controls in higher education. The second section discusses literature on safety culture theories and describes Cooper's (2000, 2016) reciprocal safety culture model as the selected theoretical framework for the study.

EH&S in Higher Education

The history of EH&S is closely related to the history of two landmark regulations of 1970 that created OSHA and the EPA. Also, higher education, environmental health, and safety issues are intrinsically related to these landmark laws, as evidenced by references by each campus' written EH&S programs and other related documents and records.

OSHA

The year 2020 marks the 50th anniversary of the Occupational Safety and Health Act (OSH Act). The OSH Act created OSHA and has significantly changed the working condition of employees in the United States (Rosner & Markowitz, 2020; Rothstein, 2020). Honoring this anniversary, Rothstein (2020) summarized the literature on a broad area of health and safety. In addition, Rothstein described the achievement of OSHA by setting minimum health and safety standards for private industry as unprecedented. Rosner and Markowitz (2020) said OSHA's history closely relates to workplace safety efforts in the United States and the fight for a safe working environment.

The flourishing climate of manufacturing in the early 20th century increased workplace hazards. Workers had to deal with heavy machinery and toxic substances without adequate safety precautions and protection, resulting in massive injury, illness, and death (Rosner & Markowitz, 2016). Manufacturing workers demanded safe working conditions primarily through labor unions. However, some trade associations (e.g., National Safety Council and the Manufacturing Chemists Association) advocated for the working people's health and safety from

the industry side to challenge established labor organizations' demands (Rosner & Markowitz, 2016).

Responding to labor unions' demands, some companies started complying with the demand for a safe work environment to a certain extent; however, the companies' voluntary actions to afford a safe, healthy working environment were often insufficient. The workforce and the public demanded the U.S. government to act instead. The companies fiercely opposed government intervention, citing some examples that the companies were doing a reasonably good job addressing workplace safety issues without regulation (Rosner & Markowitz, 2020). The only federal legislation that merely attempted to deal with workplace safety was the Walsh–Healey Act of 1936. That legislation required companies that employed more than 10,000 workers and did business with the federal government to establish workplace safety standards. The protections afforded by this legislation were limited in scope (Rosner & Markowitz, 2020).

In 1970, U.S. Congress passed the landmark OSH Act, signed by President Nixon into law, which dramatically impacted U.S. workers (Rosner & Markowitz, 2020; Rothstein, 2020). Michaels and Barab (2020) characterized the law as revolutionary and created unprecedented change. Part of the General Duty Clause of the law reads:

> (a) Each employer – (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees. (2) shall comply with occupational safety and health standards promulgated under this Act.
> (b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct. (U.S. Department of Labor, n.d., 29 USC § 654, para. a)

The OSH Act also established the National Institute of Occupational Safety and Health (NIOSH) and the National and Occupational Safety and Health Review Commission (Howard, 2020). In addition, the Act gave NIOSH the authority to serve as an independent research entity for all

occupational safety and health matters necessary to create standards, prepare educational materials and safety specialists, and research the proper use of health and safety equipment (Howard, 2020). OSHA is organized under the Department of Labor (DOL), and NIOSH is under the Department of Health and Human Services (HHS). The DOL secretary has broad authority over promulgation of the OSH Act.

The impact of the law was immediate. The rate of workplace fatalities and injuries dropped significantly. Thirty-eight workers died every day doing their jobs when OSHA was created. Currently, 14 workers die every day, with double the number of workers (Michaels & Barab, 2020). The right to work in safe conditions for millions of people was secured. Some organizations were proactive in implementing new health and safety standards (Fairfax, 2020) for fear of safety audits instead of understanding the benefit of health and safety standards. Also, many companies wrongly believed that accidents with significant consequences would not happen in their company (Fairfax, 2020). However, Fairfax (2020) argued compliance improves productivity and profitability.

State plans. The OSH Act allowed states to develop their occupational health and safety standards. State plans are monitored by OSHA and must be at least as effective as OSHA in protecting workers and preventing work-related injuries, illnesses, and deaths (OSHA, n.d.-a). For example, California Occupational Safety and Health Administration (Cal/OSHA) was created in 1973 and assumed responsibility for managing the standards (Myers, 1976). California Code of Regulations, CCR Title 8 §3203 Injury and Illness Prevention Program (IIPP) became the law of California effective July 1, 1991. The law declared, “Every employer shall establish, implement, and maintain an effective Injury and Illness Prevention Program” (California Code of Regulations, 1991b, para. a). In addition, the law requires that the program

should be in writing. Table 1 shows the elements of an IIPP. Twenty-two states have established mandatory regulations for all private and government workers, six states have mandatory regulations for government workers, and the rest are federal OSHA states (OSHA, n.d.-b).

Table 1
Elements of Injury and Illness Prevention Program

#	IIPP Element
1	Responsibility: Identify personnel who manage the IIPP
2	Systematic compliance of employees to the rules and regulations
3	Effective communication of IIPP
4	Hazard assessment at the workplace
5	Accident/Exposure investigation
6	Correct unsafe/unhealthy working conditions
7	Training and inspection
8	Record keeping: Documentation of accidents, corrections, and mitigations.

OSHA's future. According to Fairfax (2020) and Seminario (2020), OSHA was most aggressive and active in the first 30 years of its creation. Its influence has diminished in the past 20 years because of a lengthy and cumbersome standard-setting procedures, low budget, shortage of personnel, and opposition by industry and political allies. Fairfax (2020) suggested amending the law with the addition of occupational health and safety program standards, among other things. OSHA should update current standards to reflect today's work environment and create new standards for new processes and materials used in the workplace (Fairfax, 2020).

Weil (2020) coined the term "the fissured workplace" to describe the working conditions of millions of workers who have emerged due to current economic realities. According to Weil (2020), "The fissured workplace model has allowed businesses to shift risks and responsibilities onto workers and incentivize the misclassification of employees as independent contractors" (p.

640). Unfortunately, these employees are not covered by the OSH Act, resulting in disproportionately higher fatalities than regular employees. Weil (2020) suggested expanding the OSH Act to accommodate workers by delinking the Act with regular employment. Michaels and Barab (2020) agreed with the argument that the OSH Act should be strengthened. They suggested making the process of creating standards nimble by (a) increasing the budget, (b) raising the penalty for violating the safety standards, (c) expanding the scope of the law to cover all workers, and (d) giving better protection to whistleblowers.

EPA

The mission of the U.S. EPA (2020) is short and to the point: "The mission of EPA is to protect human health and the environment" (para. a). Enormous challenges faced the EPA when it was created (Currie & Walker, 2019; Miller, 2021; Wimmer, 2015). Wimmer (2015) described the state of the environment back then:

> It may be hard to believe, but before 1970, a factory could spew black clouds of toxic chemicals into the air, filling the city air with haze, or dump hazardous waste into lakes and rivers, coating them with sludge. And it was all perfectly legal. (p. 4)

This quote clearly illustrated how far the United States came in protecting the air, water, and land with the EPA's extraordinary achievements since its creation in 1970. Regulating methods of disposing hazardous made a big difference in improving the environment (Wimmer, 2015). The statutes of the EPA that have collectively changed how people work, the quality of the air, the purity of the water, etc., as shown in Table 2.

Table 2
Statutes of the EPA

Statute	Year enacted
Environmental Policy Act (NEPA)	1970
Clean Air Act	1970
The Marine Protection, Research, and Sanctuaries Act	1972
The Safe Drinking Water Act	1974
Resources Conservation and Recovery Act (RCRA)	1976
Clean Water Act	1977
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund)	1980

Hazardous waste management. A characteristic hazardous waste is any waste that has properties of toxicity, flammability, corrosivity, and or reactivity (Environmental Protection Agency, 2022). In the United States, hazardous waste is regulated by the EPA to protect the environment and keep people safe. Universities generate hazardous waste from many sources and variety of activities; to name a few, (a) teaching, (b) maintenance, (c) janitorial, and (d) construction. The campuses maintain a hazardous waste management program that details the storage and disposal process of hazardous materials. As the generators of the waste, the schools are responsible for the waste as stated in the Resources Conservation and Recovery act (RCRA). The EPA has the authority to control hazardous waste from the cradle to the grave afforded by RCRA (EPA, 2021, 42 U.S.C. §6901 et seq. (1976)). A universal hazardous waste manifest is used to track hazardous waste from the time it leaves the generator site through transportation, treatment, storage, and disposal. The Department of Transportation (DOT) regulates the transportation of hazardous materials to ensure safe transfer of hazardous substances by land, air, and sea. Hazardous waste management involves the generator of the waste; OSHA; transporter; and the treatment, storage, and disposal facility (TSDF). Each hazardous substance, group of hazardous materials, or waste stream have a unique four-digit United Nation (UN) number. The

UN number, the name of the substance, accompanying EPA code, state codes, packaging requirements, hazard class, and emergency code, among other information, must be entered on the universal hazardous waste manifest and signed by the generator and the transporter. The Hazardous Materials Table, 49 FCR§172. 101 (Code of Federal Regulations, n.d.), provides details required for packaging and transportation of hazardous materials. For example, the shipping name of a chemical waste that contains acetone and sulfuric acid is the following: UN3286, Waste flammable liquid, toxic, corrosive, n. o. s., (acetone, sulfuric acid), 3(6.1,8), II. The generator and EPA receive a copy of the manifest when the hazardous waste leaves the generator's site and another copy when the disposal facility completes hazardous waste disposal. This process ensures the cradle-to-grave approach as mandated by RCRA (EPA, 2020). Universities follow this process to dispose of any hazardous waste generated in their premises.

The EH&S profession. Leadership plays a crucial role in maintaining a positive safety culture (Cooper, 2016; Lundell & Marcham, 2018). Lundell and Marcham (2018) expressed this sentiment when they stated, "The type of leadership practices and styles in an organization directly determine the safety culture, safety program participation and safety outcomes that can be expected within the organization" (p. 37). The EH&S leader's role in higher education is broad (see Appendix A); for example, part of the job description of a health and safety director at California State University system reads:

> Plan, organize, and/or direct campus environmental health and occupational safety programs. Responsible for program development; accident prevention and control; safety education; accident investigation, analysis and reporting; industrial hygiene; risk management; and occupational health and safety. May have responsibility for related functions (e.g., workers' compensation). (The California State University, n.d., p. 26)

Simon (1999) correctly predicted the contemporary health and safety professional will require both a technical expert and a change agent. Becoming a member of professional associations and organizations, such as those shown in Table 3, helps EH&S professionals keep up to date.

Table 3
EH&S Professional Associations

Professional Association	Acronym
Air and Waste Management Association	AWMA
Alliance of Hazardous Materials Professionals	AHMP
American Academy of Environmental Engineers	AAEES
American Industrial Hygiene Association	AIHA
American Society of Safety Professionals	ASSP
Campus Safety, Health, and Environmental Management Association	CSHEMA
National Association for EH&S & Management	NAEM
National Environmental Health Association	NEHA
National Safety Council	NSC
World Safety Organization	WSO

Education and credentialing are important aspects of the EH&S profession; however, McCormick (2020) found a lack of consistency in educational and credentialing requirements for environmental and health professionals. Universities offer EH&S and occupational health and safety degrees. Universities, private firms, and trade associations offer EH&S certificates. Table 4 shows most of the EH&S professional certificates.

According to zippia.com (2022), a career website, 67% of EH&S directors have a bachelor degree, 17% have a master's degree, 12% have associate degrees, and 3% have other degrees. The site also claimed 83.5% of EH&S directors are men, and 16.5% are women. These figures are for all fields. No data were found specific to higher education. The EH&S director's

career path may include (a) experience in the area and in related fields, (b) certification such as Certified Safety Professional (CSP), and (c) education (Glassdoor, n.d.).

Table 4
Common EH&S Certificates

EH&S Certificates	Acronym
Associate in Risk Management	ARM
Associate Safety Professional	ASP
Certified Environmental and Safety Compliance Officer	CESCO
Certified Hazardous Materials Manager	CHMM
Certified Industrial Hygienist	CIH
Certified Professional Environmental Auditor	CPEA
Certified Professional Ergonomist	CPE
Certified Safety and Health Manager	CSHM
Certified Safety Director	CSD
Certified Safety Manager	CSM
Certified Safety Professional	CSP
Construction Health and Safety Technician	CHST
Licensed Safety Professional	LSP
Occupational Hygiene and Safety Technician	OHST
Qualified Environmental Professional	QEP
Registered Environmental Manager	REM
Safety Director Certificate	SDC
Safety Professional Certificate	SPC
Safety Trained Supervisor	STS
Safety Trained Supervisor Construction	STSC
Sustainability and Climate Risk Certificate	SCR

Madsen et al. (2019) claimed health and safety professionals are characterized by multidisciplinarity and heterogeneity. Furthermore, Dekker (2017) facetiously compared the health and safety profession with a priesthood when he recognized parallels in what both professions say to keep the prospective audience engaged.

Health and Safety Potential Risks at Higher Education

Where there is human activity, there is a varying degree of health and safety risk (Binder, 2001). Higher education laboratory work entails (a) chemical, (b) physical, (c) electrical, (d) mechanical, (e) ergonomic, and (f) psychosocial risks (Ozdemir et al., 2017). Depending on the campus, most universities must deal with various health and safety hazards during routine daily activities and special projects. There are hazardous chemicals and radioactive materials in many research labs, bloodborne pathogens and infectious substances in biology and medical laboratories, and electrical and laser hazards in physics and other departments. Janitorial staff may be exposed to any of the hazards depending on how the risk of exposure is managed. The facilities or maintenance crew is faced with ever-changing safety challenges in addressing issues related to smoothly running facilities. The performing arts deal with a host of hazardous chemicals and physical hazards by complex rigging systems and heavy equipment movement (Hinkamp et al., 2017). Personnel in agriculture departments are subject to pesticide hazards, herbicides, fertilizer, and harsh outdoor weather (Damalas et al., 2019). Athletics and kinesiology department staff can sustain injuries caused by sports and physical activity. Ergonomics could render a significant risk in a variety of campus workplace settings. This list is not, by any means, a complete breakdown of potential workplace hazards facing in higher education. The critical question is: How do campuses manage the potential risk of injury and illness, including infection outbreaks such as the COVID-19 global pandemic?

The COVID-19 global pandemic phenomenon brought grief to millions of people, severely disrupted human relations, wreaked havoc on the globe’s economy, and altered the teaching and learning process at universities all over the world (Girdhar et al., 2020; Ozili & Arun, 2020). People have to be familiar with concepts such as quarantine, social distancing,

sanitization, face covering, masking, and ventilation for protection from COVID-19 infection. Personal protection equipment (PPE), which is popular in industry, medical, pharmaceutical, research, and science laboratories, became a household acronym. PPE is the least effective means of protection, as is discussed in the next section, under hierarchy of controls.

Hierarchy of controls. When it comes to managing hazardous materials, a method called the hierarchy of control (CDC, 2015) is used to mitigate risk. NIOSH illustrates this concept in the shape of an inverted pyramid, as shown in Figure 3.

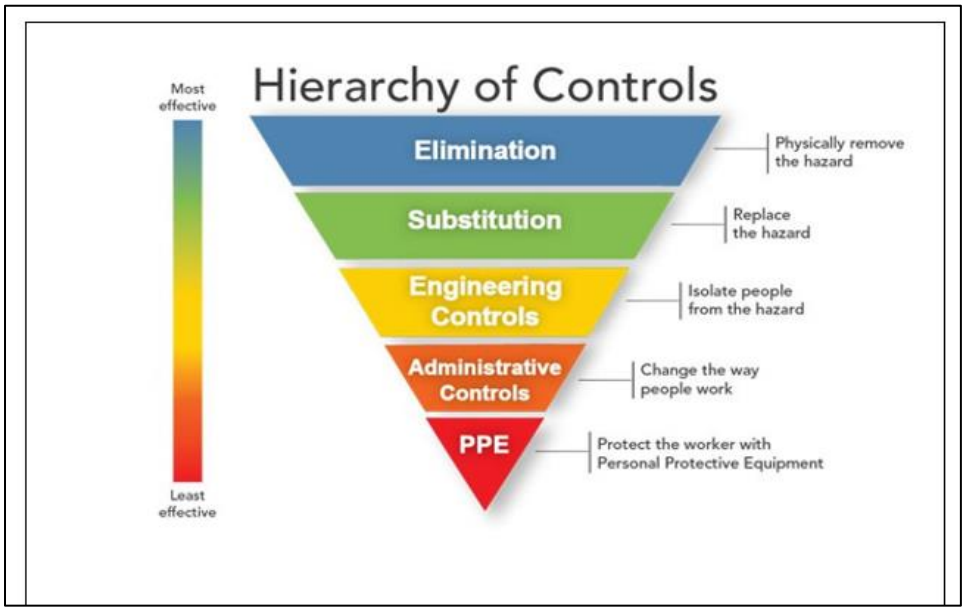

Figure 3. Hierarchy of controls.

The hierarchy of controls was developed by the National Institute for Occupational Safety and Health (NIOSH), the research arm of OSHA, organized under the CDC. NIOSH (2021) plays a crucial role in conducting research, developing methods, creating safety equipment standards, and more for workplace safety (CDC, 2018; Howard, 2020). COVID-19 is used an example to discuss hierarchy of controls (Cornell University, 2021).

Elimination and substitution. Elimination is the best control to avoid exposure to hazardous substances (Lyon & Popov, 2020). Substituting safer materials for hazardous substances, where possible, is the next best option for minimizing risk. Both elimination and substitution are challenging to implement in existing processes, but more manageable at the design stage. Universities adapted remote learning and teaching to minimize the spread of COVID-19 for most of 2020 and 2021 as a method of elimination.

***Engineering controls*.** The third most effective means shown in the hierarchy of control is to create a working environment designed to protect people from hazards through engineering. Fume hoods and biosafety cabinets are some examples of engineering control in a laboratory environment. Room ventilation, an engineering control method, was also one of the preventive measure topics during the COVID-19 global pandemic (Blocken et al., 2021; Wang et al., 2021). Blocken et al. (2021) found a combination of ventilation and air cleaning could reduce aerosol particle concentrations. A vaccine is the best solution against a pandemic (Spigarelli, 2020). The dramatic effect of COVID-19 vaccines after the first Food and Drug Administration emergency use authorization on December 11, 2020, is shown in Figure 4 as one example of engineering control.

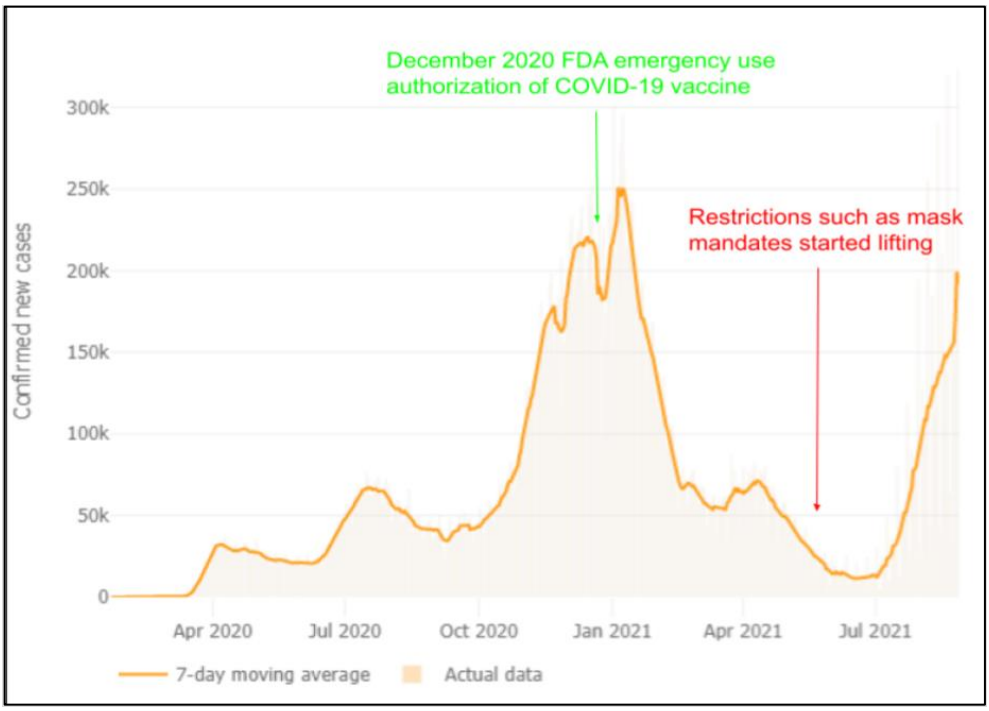

Figure 4. The COVID-19 vaccine effect.

Administrative controls. Administrative controls are the implementation of change in the way people act daily. For example, Spigarelli (2020) listed personal hygiene practices such as frequent handwashing with the appropriate soap and for the necessary amount of time, isolation of people, limited sizes of gatherings, and a 6-foot separation maintained between people when in groups related to a pandemic. Another example of administrative control during the pandemic was distance learning. Distance learning became a norm for disseminating educational information via Zoom and other computer applications in all levels of teaching and learning as an administrative control in mitigating the risk of COVID-19 spread. However, administrative control stands next to the worst method in the hierarchy of controls, PPE. PPE is the last resort for protection from hazards. Still, this method was widely applied to mitigate the spread of the COVID-19 global pandemic (Spigarelli, 2020).

PPE. PPE, one of the most-discussed topics during the COVID-19 global pandemic, is the least effective protection method on the hierarchy of control. The advantages and limitations of mouth covering were widely discussed in the media at the beginning of the COVID-19 global pandemic. Even though public health professionals agreed on the advantage of mouth covering in controlling the virus's spread, wearing a face mask has become a political issue. Lee (2020) identified a lack of a coordinated national plan, misinformation campaign, and lax efforts to follow precautions as some of the main reasons leading to the continued rise of daily infection in the United States (see Figure 1). Dr. Anthony Fauci, Director of the National Institute of Allergy and Infectious Diseases defended the guidance not to wear masks early in the pandemic. He said this guidance was correct based on the information available at the time, as public health officials also needed to allocate the available PPE to medical personnel and they did not want the public to buy all PPE and leave doctors and nurses unprotected (Panetta, 2020). Still, there was a substantial worldwide shortage, and soon, fabric masks were proven to slow the spread (Wang et al., 2020).

Background for Theoretical Framework

Safety is a situation where the risk of accident, incident, injury, harm, and danger resulting from operational hazards and exposure to hazardous substances are kept as low as reasonably practicable (Lyon & Popov, 2020). According to Le Coze (2019b), academic literature did not include safety-related studies until about 1980. In the last 40 years, scores of journal articles, models, and approaches have flourished that enriched the field of safety. One focus of safety scholarship was to put the concept of safety culture in a theoretical perspective. Unfortunately, that effort did not produce a consensus on interpreting and approaching the

concept of safety culture (Guldenmund, 2018; Hopkins, 2018). This section begins with a discussion of the concept of culture to lay a ground for a better understanding of safety culture.

Culture

Culture is a complex concept (Antonsen, 2017; Guldenmund, 2018; Smith, 2016). Antonsen (2017) described the complexity of defining culture as opening a Pandora's box because it requires understanding consequential social science concepts. There are more than 160 definitions of culture in existing literature (Smith, 2016). The variations in the definition of culture have roots in different disciplines, such as social anthropology, cultural sociology, and organizational psychology. Smith (2016) observed inconsistency of the definition of culture in even just one discipline, as he analyzed literature in a wide range of publications in cultural sociology. The discussion of the concept of culture in this study is in organizational and safety context and informed by the study's topic: organizational safety culture. The dynamic definition of culture by Schein and Schein (2017) is:

> The culture of a group can be defined as the accumulated shared learning of that group as it solves its problems of external adaptation and internal integration; which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, feel, and behave in relation to those problems.
>
> This accumulated learning is a pattern or system of beliefs, values, and behavioral norms that come to be taken for granted as basic assumptions and eventually drop out of awareness. (p. 6)

The illustration of culture as a three-layered model is shown in Figure 5. The three layers of culture, according to Schein and Schein (2017), are (a) basic assumptions, (b) espoused values, and (c) artifacts.

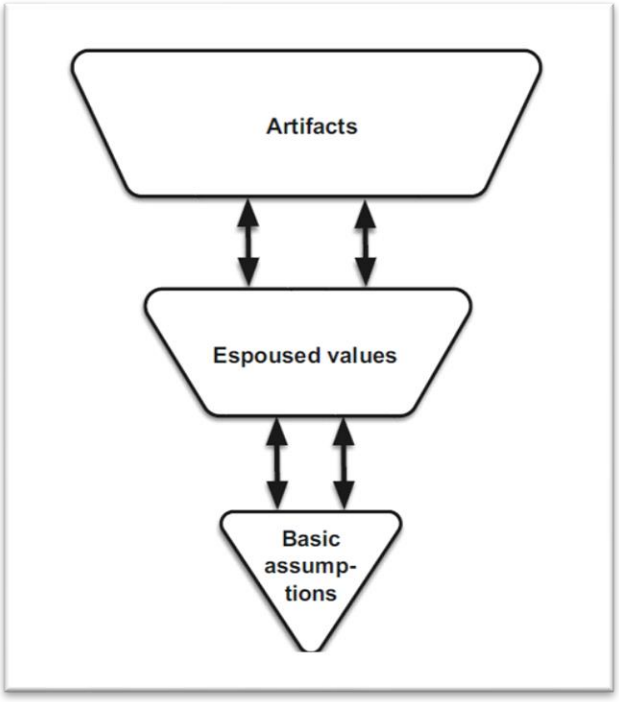

Figure 5. Schein's culture model.

Safety Climate and Safety Culture

Zohar (1980), who wrote extensively on the topic related to safety climate, defined safety climate as "a summary of molar perception that employees share about their work environments" (p. 96). Schein and Schein (2017) considered climate as an artifact and manifestation of culture. Guldenmund (2018) noted, "Safety climate, as opposed to safety culture, is a 'psychological variable,' describing attitudes and perceptions typically assessed at the level of an individual employee" (p. 30). Often and incorrectly, safety culture and safety climate are used interchangeably. Cooper (2016) explained the difference as:

> Safety culture refers to a durable corporate atmosphere which impacts people's management of safety in an organisation (*the way we do safety around here*) while safety climate is considered to reflect the organisation membership's shared perceptions of the way safety is being managed at a particular moment in time (*what we think of safety right now*). (p. 3, *emphasis in original text*)

Cooper (2000) believed one important element of the safety culture construct—the product, observable collective and continued effort by organizations to achieve a safety goal that encompasses the behavior of all employees—has been overlooked by many scholars. According to Cooper (2000), "This oversight has led to an overly narrow emphasis on safety climate with it being used as a surrogate measure of safety culture, at the expense of the holistic, multi-faceted nature of the concept of safety culture itself" (p. 114).

Safety Culture

The concept of safety culture gained increasing popularity after the Chernobyl nuclear disaster in then-Soviet Ukraine in 1986 (Antonsen, 2017; Smith & Wadsworth, 2009). The International Atomic Energy Agency (IAEA) attributed the cause of the accident to deficient safety culture (Antonsen, 2017). The Chernobyl nuclear disaster caused a city with 50,000 people to be abandoned. Brown (2019) argued thousands of people might have died, rather than the mere 50 officially reported; in neighboring communities in Russia, Belarus, and Ukraine, people live in an atmosphere contaminated with radioactive residual. After the Chernobyl catastrophe, many other accident investigations of high-profile disasters pointed to the organizations' safety culture as the accidents' root causes (Antonsen, 2017). Consequently, looking at risk and safety in light of the organizational culture perspective received more attention. As a result, organizations started developing safety recommendations that would help develop a "good safety culture" (Clarke, 2000, p. 68).

There are over 50 definitions of safety culture construct (Vu & De Cieri, 2014 as cited by Cooper, 2018). The Advisory Committee on the Safety of Nuclear Installations (ACSNI, as cited by Antonsen, 2017) defined safety culture as, "The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment

to, and the style and proficiency of, an organization's health and safety management" (p. 16). Cooper (2018) defined safety culture as, "Safety culture is a social construct used by industry and academe to describe the way that safety is being managed in organisations to avoid catastrophes and personal injuries" (p. 59).

Safety Culture Theoretical Frameworks and Safety Culture Models

There remains a lack of consensus on the theoretical framework that best guides scholarship for safety culture. Interpretive and functionalist approaches to the meaning of safety culture are the root causes of differences that led to "the development of various frameworks with which to view, measure, analyze, extract, and assign meaning to the construct" (Cooper, 2016, p. 1).

Some key safety culture theories include: (a) interpretive three-layered organizational culture framework, derived from Schein (Guldenmund, 2018) organizational culture theory; (b) natural accident theory (NAT), which asserts accidents happen no matter what (Perrow, 2011); (c) man-made disasters, which posits accidents do not occur suddenly, but instead result from "incubation," which is triggered by some event (as cited by Antonsen, 2017); (d) high-reliability organizations, resilience engineering (Le Coze, 2019b); (e) Reason's five interdependent sub-cultures theory (Reason, 1998); and (f) the reciprocal safety culture model (Cooper, 2000, 2016, 2018).

High-reliability organizations, resilience engineering, has gained prominence in the field of safety in the past 10–30 years (Le Coze, 2019b). High-reliability organizations originated on the idea of "nearly error-free operation in high-risk systems such as nuclear power plants, aircraft carriers, nuclear power plants, and air traffic controls by a group of researchers from different disciplines called 'the Berkeley team'" (Le Coze, 2019b, p. 471).

Cooper's Reciprocal Safety Culture Model

Cooper (2016) argued the relationship of models based on safety climate to safety outcomes is insignificant, citing many studies. As Cooper (2016) noted:

> In sum, of 141 studies reviewed, only 12 (9%) attempted to establish a relationship between safety climate and actual safety outcome data, which is a damming indictment of the quality and validity of most scientific research into the safety climate concept to date. (p. 17)

Cooper's reciprocal safety culture model (see Figure 6) uses goal setting theory by Locke and Latham, adapts Bandura's reciprocal determinism, and leverages Bandura's social learning theory in developing the theory (Cooper, 2000, 2016, 2018). Cooper claimed the reciprocal safety culture model incorporates many features of other safety culture models that used Schein and Schein's (2017) three-layer culture model and safety climate as their foundation. However, Cooper rejected the idea that only core values (e.g., attitudes, beliefs, and perceptions) dictate an organization's safety outcomes. Instead, incorporating safety culture characteristics and the safety culture product is required to understand organizational safety culture holistically.

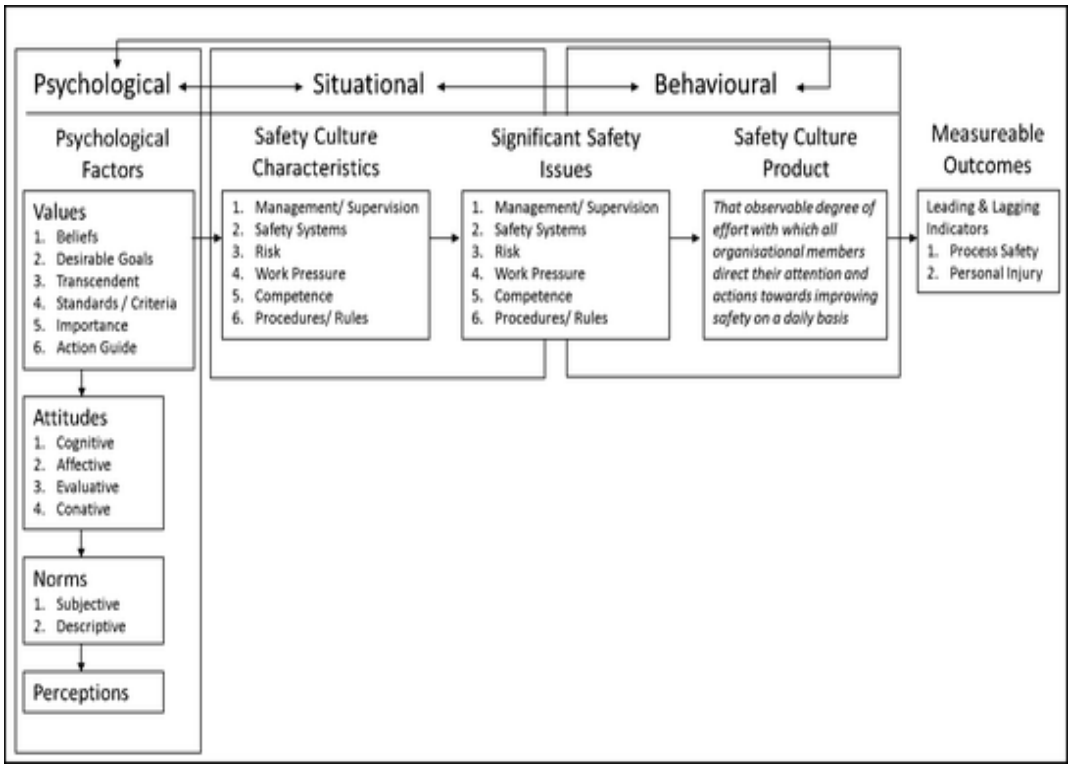

Figure 6. Cooper's reciprocal safety culture model.

As mentioned, one challenge of safety culture research is the lack of a clearly defined theoretical framework as a guide (Cooper, 2000; Guldenmund, 2018) for scholarship and practice. Cooper claimed to have solved this problem by asserting the reciprocal safety culture model can be used for qualitative and quantitative studies (Cooper, 2000).

Safety culture is a product of the reciprocal interaction of situational elements with psychological and behavioral elements (Cooper, 2000, 2016, 2018). The model's characteristics are "management/supervision, safety systems, risk, work pressure, competence, and procedures and rules" (Cooper, 2018, p. 51). Cooper claimed these characteristics are part of known safety management systems such as OSHA and ANSI (American National Standards Institute).

Cooper (2000) acknowledged the limitations of the collective knowledge and suggested taking a broader view of further developing the safety culture construct. However, safety culture

is an accepted concept by many (Le Coze, 2019a; Vogus & Sutcliffe, 2007). Thus, the safety culture model by Cooper guided this inquiry.

Summary

Chapter 2 touched upon many topics related to this inquiry. The roles of federal and state agencies, such as OSHA and EPA, were highlighted. Literature on key aspects of the EH&S profession, EH&S potential risks, and the hierarchy of control were discussed. The chapter also presented Cooper's (2000) reciprocal safety culture model that guided this study as a theoretical framework. The methodology is the focus of Chapter 3.

CHAPTER 3: METHODOLOGY

The purpose of this inquiry was to study higher education health and safety leaders' perspectives on safety culture in U.S. higher education institutions. The following research questions guided the inquiry:

1. How do EH&S leaders shape the safety culture of higher education?
2. How do EH&S leaders of higher education explain the effect of the safety culture of higher education on health and safety program outcomes?

Research Design

This inquiry followed mixed methods research design to find answers to the research questions. This section introduces each component of the method: (a) qualitative research, (b) quantitative research, and (c) mixed methods research.

Qualitative Research

According to Merriam and Tisdell (2015), qualitative research is a complex topic; thus, the authors explained the term through its four common characteristics: "the focus is on process, understanding, and meaning; the researcher is the primary instrument of data collection and analysis; the process is inductive; and the product is richly descriptive" (p. 15). Basic qualitative study comprised part of this study. According to the same literature, basic qualitative research is the most common type of qualitative study; however, many aspiring qualitative researchers fail to assign a type of qualitative research to their study (Merriam & Tisdel, 2015). The other common types of qualitative research are (a) ethnography, (b) grounded theory, (c) narrative inquiry, (d) phenomenology, and (e) qualitative case study research. In general, basic qualitative study is a qualitative method that is not any of the well-established methodologies (Caelli et al., 2003; Merriam & Tisdell, 2015). The other qualitative studies have additional aspects besides

the common characteristics described. For example, ethnographic research has a cultural dimension. Data obtained by basic qualitative research may be analyzed through finding patterns and themes, followed by interpretation and attributing meaning (Merriam & Tisdell, 2015).

Quantitative Research

Creswell and Creswell (2017) defined quantitative research as "an approach for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures" (p. 4). The process is deductive, and generalization of findings is expected, according to the authors.

Mixed Methods Research

Mixed methods research continues to grow in popularity (Harrison et al., 2020). Johnson et al. (2007, as cited by Harrison et al., 2020) acknowledged the existence of multiple definitions of mixed methods and settled on the following based on an analysis of definitions from literature by leading authors in the field:

> Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purpose of breadth and depth of understanding and corroboration. (p. 123)

There is no solid borderline that divides qualitative and quantitative methods; instead, the methods are extreme ends of a continuum, in which mixed method stands in the middle of the methods (Creswell & Creswell, 2017). Creswell and Creswell (2017) affirmed, "More insight into a problem is gained from mixing and integrating qualitative and quantitative data" (p. 213). There are distinct ways of mixing qualitative and quantitative data. Convergent mixed method design, QUAL+quan (Creswell & Creswell, 2017), served the study's purpose. QUAL+quan

designation, according to Creswell and Creswell (2017), is for a convergent mixed methods study where more emphasis is placed on qualitative data. The interviews generated more data to answer the research questions than the survey data, so they were given more emphasis. Mixing the qualitative findings and quantitative results was conducted in the interpretive phase (Harrison et al., 2020).

Research Setting and Participants

EH&S leaders at higher education campuses take responsibility of keeping their campuses environment healthy and safe. They address the EH&S regulatory compliance issues and lead EH&S professionals and EH&S programs at their institutions. The higher education EH&S leaders are the middle managers of complex organizations. Listening to their stories, understanding their perspectives, and collecting their views on safety culture and operations elicited answers to the research questions. Current higher education EH&S leaders across the United States participated in the research. Twenty-three EH&S leaders responded to the survey, and eight participated in interviews. More details on the participants are presented in Chapter 4.

Data Collection

Interviews and a survey provided data for the study. I used a variety of methods to reach out to volunteers: (a) I invited individual higher education leaders to participate through email; (b) I solicited the Campus Safety, Health, and Environmental Management Association (CSHEMA) members, where I am a member; (c) I tried snowball sampling—a method of finding more volunteers after interviewing a few people and asked the early interviewees for references to other potential participants who might have been interested in the study (Merriam & Tisdell, 2015). In each case, I sent a research invitation (see Appendix B) email with a link to the survey and research participation consent form (see Appendix C). The survey (see Appendix D)

included a question to recruit participants for an interview. The survey data were used to screen participants as current higher education EH&S leaders for interviews. The interviews were semistructured (Merriam & Tisdell, 2015). Semistructured interviews allowed for follow-up questions based on the conversations without a need for prewritten script (see Appendix E). The interviews lasted from 1–1.5 hours and were conducted via Zoom. The interviews were recorded, and all copies of the interview files were kept in password protected folders and a password-protected computer.

Data Analysis

Google Forms was used to collect survey data, and Excel was used to analyze the survey data. The data were tabulated, and descriptive statistics were applied. Data analysis of the qualitative data started as soon as the first interview was conducted with a fresh memory of the conversation as suggested in the literature (Creswell & Creswell, 2017). The interview recordings were transcribed into written documents using Zoom's built-in function. The documents were checked for accuracy. The theoretical framework, Cooper's (2000) reciprocal safety culture model, and the research questions guided the coding and description of the data. The overall scheme of the interview data analysis followed sequential steps "from the specific to the general and involving multiple levels of analysis" (Creswell & Creswell, 2017, p. 193) as following: (a) preparing and organization, (b) reading and understanding, (c) coding and categorization, (d) description and thematization, and (e) representation and conveyance.

A similar approach described by Braun and Clarke (2006) was used as a cross reference to identify patterns and themes in the interview data. This approach employed six phases: (a) knowing the data intuitively; (b) coding the entire data systematically; (c) organizing codes to themes; (d) reviewing the themes to check they work in relation to the codes; (e) interpreting,

naming, and continuously refining the themes; and (f) creating the report (Braun & Clarke, 2006). QSR NVivo, Release 1.6.1. and Microsoft Excel were used to aid in the coding process. Creswell & Creswell (2017) recommended using qualitative data analysis software, and QSR NVivo is one of the programs they mentioned. The mixing of the qualitative and quantitative data followed a convergent method of integration (Creswell & Creswell, 2017; Harrison et al., 2020). More emphasis was given to the qualitative data because the interviews addressed the research question more directly.

Trustworthiness

Academically established methods, procedures, and norms were followed in data collection, analysis, and interpretation to ensure the study's integrity and trustworthiness. I kept the trustworthiness of the study to the highest standard. Using multiple data collection methods served as one way of testing the rigor of an inquiry that allowed deploying a triangulation method (Merriam, 1998). Merriam and Tisdell (2015) stated, "Probably the best-known strategy to shore up the internal validity of a study is known as triangulation" (p. 244). The qualitative data were obtained through interviews of eight higher education EH&S leaders with a wide range of experiences and backgrounds across the United States. Merriam and Tisdell (2015) refer to "comparing and cross-checking" the type of interview data collected in this study as a "triangulation using multiple sources of data"(p. 245).

In addition to multiple data sources, this study employed qualitative and quantitative methods. Creswell and Creswell (2017) explained the application of triangulation to mixed methods research as, "Triangulating data sources-a means for seeking convergence across qualitative and quantitative methods-was born" (p. 14).

Another method for ensuring the data's trustworthiness is member checks (Merriam, 1998; Merriam & Tisdell, 2015) to communicate the transcribed data back to the interviewee to verify accuracy.

Ethical Considerations

Data obtained from health and safety leaders using both methods are kept in a secure location and will remain there for the next 3 years, then will be destroyed. The participant identities were kept confidential. Random numbers that only I know were assigned to the participants. The real names of the subjects will never be disclosed. The integrity of the data at the collection, analysis, and reporting stages remains of utmost importance by strictly following Institutional Review Board (IRB) guidelines in all aspects of the inquiry.

Limitations

It was not the scope nor the intent of this study to try to assess nor fully understand the safety culture of higher education. Rather, the intent of the study was to understand the views of higher education EH&S leaders on safety culture of their institutions. To fully understand the safety culture and the health and safety program of an academic institution, all other elements of safety culture—psychological, behavioral, and situational (Cooper, 2000; Lefranc et al., 2012)—must be investigated. Also, even though participants were higher education EH&S leaders across the United States, the results and findings are not representative of the nation’s higher education EH&S leaders. I did not use inferential statistics because the sample was not representative, and the sample size was too small for generalization.

Role of the Researcher

As the researcher of this study, I was responsible and in charge of most aspects of the work with my committee chair’s and committee members’ support. As an EH&S professional

for over 5 years, I have a critical perspective on this topic. My previous EH&S professional role in the industry and academia gave me access to the knowledge of the operational aspect of the field. Therefore, I have ideas of how things could improve. However, I needed to set aside those ideas and preconceptions to allow the study to go forward unbiased. I was aware of this fact and remained mindful of managing my perspective. It was sometimes a challenge to eliminate my bias totally; however, my awareness helped prevent influencing the study process by applying disciplined subjectivity. I acknowledged my position and checked myself throughout the study. I used a field log, one strategy to enhance reflexivity, in the study. McMillan and Schumacher (2014) described a field log as, "Maintain a log of dates, time, places, persons, and activities to obtain access to informants and for each dataset collected" (p. 334).

Summary

In this chapter, the research design was discussed. The rationale for choosing mixed methods was explained. The data collection and analysis steps were presented. The trustworthiness of the inquiry, ethical considerations, and the role of the researcher were explained. The limitations of the study were acknowledged. In Chapter 4, the results and findings are presented.

CHAPTER 4: FINDINGS

The purpose of this inquiry was to study the higher education environmental health and safety (EH&S) leaders' perspectives on safety culture in U.S. higher education institutions. The following research questions guided the inquiry:

1. How do EH&S leaders shape the safety culture of higher education?
2. How do EH&S leaders of higher education explain the effect of the safety culture of higher education on health and safety program outcomes?

I used a mixed methods research approach to find answers to the research questions. EH&S leaders of U.S. higher education institutions were surveyed and interviewed. A descriptive analysis of the survey data and a thematic analysis of the qualitative data provide the results and findings that answered each research question, and are presented in this chapter.

Participants and Data Collection

Table 5 shows the participants' current titles, years of service as EH&S professionals, and the survey date. The survey data were collected from November 17, 2021, to February 25, 2022 in three phases. During Phase 1, I sent invitations through email to 23 EH&S leaders at one of the largest higher education systems in the United States. The initial plan was to focus just on this higher education system. A subsequent follow-up to glean more participants netted five responses, in which four of them agreed to interviews. Attempts to secure more participants through personal communications by the already volunteered leaders also failed.

Table 5
Participants

Participant	Title	Years	Number of staff	Survey date
1	Director of Enterprise Risk Management and Environmental Health and Safety	16	2 to 3	11/17/2021
2	Director for Safety & Risk Management	13**	4 to 7	12/8/2021
3	Director EHS	3*	2 to 3	1/5/2022
4	Director EHS	10	2 to 3	1/14/2022
5	Environmental Safety Manager	32	2 to 3	1/23/2022
6	Department Chair, Safety and Health	NR	4 to 7	1/23/2022
7	Assistant Director of Public Safety for Environmental Health and Safety	10	1 to 3	1/24/2022
8	Environmental Lab Manager	5*	> 15	1/25/2022
9	Assistant Director	2*	8 to 11	1/26/2022
10	Director	10*	1 to 3	1/31/2022
11	Environmental Health & Safety Officer	3*	1 to 3	1/31/2022
12	Director of Safety Health & Sustainability	23	8 to 11	2/3/2022
13	Chief Occupational and Environmental Safety Officer	3*	2 to 3	2/7/2022
14	Assistant Director for Research Safety	35	> 15	2/5/ 2022
15	Vice President for Safety, Health, Environment & Risk Management/Professor of Occupational Health	29	> 15	2/11/2022
16	Director, EH&S	NR	> 15	2/13/2022
17	Assistant Vice Chancellor	7*	> 15	2/14/2022
18	Director for Safety	NR	1	2/14/2022
19	Assistant Director for Safety	NR	1	2/23/2022
20	Assistant Director	32*	> 15	2/24/2022
21	Director	3.5*	4 to 7	2/24/2022
22	Director EHS	13*	4 to 7	2/24/22
23	Director for Safety	9*	4 to 7	2/25/2022
Interviewed	Participants 1, 2, 4, 5, 7, 12, 14, and 15			
*	Response to the survey question “How long do you have this title?”			
**	Includes information in the interview			
NR	No response to the survey question “How long do you have this title?”			

During Phase 2, I broadened the audience to U.S. higher education after receiving proper Institutional Review Board (IRB) approval to gather more data. I sent an invitation through the Campus Safety, Safety, Health, and Environment Association (CSHEMA) listserv group with over 5,000 members who were all levels of EH&S professionals and where I am a member. I

secured 16 responses from CSHEMA. Among the 16 volunteers, two of them agreed to interviews. One response was dropped due to not qualifying as EH&S leader data.

In Phase 3, I sent invitation emails to 153 higher education EH&S leaders across the country, which resulted in four more participants—bringing the qualified participants to 23. Because of the different audiences, calculating the survey's response rate was not straightforward; however, the response rate was 21.7% for the regional higher education system, 0.3% for CSHEM, and 3.3% for the final direct mail. The 23 participants were regionally distributed from the West to East and North to South. Participants 1, 2, 4, 5, 7, 12, 14, and 15 (see Table 5) were interviewed. Interviews were conducted from January 27, 2022, to February 18, 2022 via Zoom and took from 1–1.5 hours each. Half of the interviewees were females and half were males.

Questionnaire Results

The purpose of the survey was to collect data that would contribute to answering the research questions and qualifying volunteers for the interview. The questions focused mainly on higher education management and leadership, EH&S operations, safety culture, and safety programs. Table 6 provides the summary of the survey results of 23 EH&S leaders in U.S. higher education followed by descriptions of the major results. Only descriptive statistics were employed for reasons set forth in the study's limitations.

Table 6
Questionnaire Result

Survey item	Strongly agree (4)		Agree (3)		Disagree (2)		Strongly disagree (1)		Mean	SD	Total
As EHS Director, shaping the safety culture of my campus is part of my role.	69.6%	16	30.4%	7	0.0%	0	0.0%	0	3.7	1.31	23
My campus did a good job in the initial COVID-19 global pandemic response.	69.6%	16	21.7%	5	8.7%	2	0.0%	0	3.6	1.28	23
Senior leadership works with my department in COVID-19 global pandemic response.	59.1%	13	27.3%	6	13.6%	3	0.0%	0	3.5	1.06	22
I am satisfied with my campus's overall pandemic response.	56.5%	13	39.1%	9	4.3%	1	0.0%	0	3.5	1.06	23
My role in the campus COVID-19 decision-making process has been significant.	54.5%	12	18.2%	4	27.3%	6	0.0%	0	3.3	0.94	22
The safety culture of my campus positively affects the health and safety outcomes of my campus.	52.2%	12	30.4%	7	17.4%	4	0.0%	0	3.3	0.91	23
I believe the university leadership sets the tone for the safety culture of my campus.	36.8%	7	26.3%	5	31.6%	6	5.3%	1	2.9	0.58	19
If your campus is part of a university system: The system-wide safety culture affects the safety outcomes of my campus.	36.8%	7	26.3%	5	31.6%	6	5.3%	1	2.9	0.58	19
I am part of the top-level decision-making body of my campus in the pandemic response.	36.4%	8	27.3%	6	22.7%	5	13.6%	3	2.9	0.57	22
Campus staff demonstrates a positive attitude toward my environmental health and safety (EHS) operation, such as safety training, inspections, and audits in their area.	34.8%	8	56.5%	13	8.7%	2	0.0%	0	3.3	0.85	23
Campus management demonstrates a positive attitude toward my EHS operation, such as training, inspections, and audits in their department.	30.4%	7	65.2%	15	4.3%	1	0.0%	0	3.3	0.94	23

(Table 6 Continued)

Survey item	Strongly agree (4)		Agree (3)		Disagree (2)		Strongly disagree (1)		Mean	SD	Total
There is a positive relationship between EHS audits and their effect on the EHS program outcomes at my campus.	30.4%	7	47.8%	11	17.4%	4	4.3%	1	3.0	0.67	23
Campus faculty demonstrates a positive attitude toward my EHS operation, such as training, inspections, and audits in their department.	26.1%	6	60.9%	14	13.0%	3	0.0%	0	3.1	0.82	23
The campus leadership supports my EHS operation through budget allocation, staffing, sponsorship, etc.	26.1%	6	34.8%	8	34.8%	8	4.3%	1	2.8	0.47	23
Students demonstrate a positive attitude toward my EHS operation, such as safety training, inspections, and audits.	22.7%	5	72.7%	16	4.5%	1	0.0%	0	3.2	1.01	22
Safety culture is a well-understood concept in my university.	10.5%	2	52.6%	10	31.6%	6	5.3%	1	2.7	0.65	19
I am satisfied with my department's health and safety programs.	8.7%	2	60.9%	14	26.1%	6	4.3%	1	2.7	0.79	23
I would do things differently in the overall COVID-19 global pandemic response if I had enough authority.	8.7%	2	17.4%	4	56.5%	13	17.4%	4	2.2	0.42	23

Safety Culture

The assumption EH&S leaders play a role in shaping the safety culture of their respective higher education institution was the basis for the first research question. The following survey result indicates the assumption was right. Seventy percent of EH&S leaders *strongly agree* shaping the safety culture of their campus is part of their role. Thirty percent of EH&S leaders *agree* shaping the safety culture of their campus is part of their role. One hundred percent of EH&S leaders *strongly agree* or *agree* shaping the safety culture of their campus is part of their role. Comparing the means of the survey items showed the same result. The mean for each question was calculated to know which survey question resulted in a more favorable or less favorable response. The survey item's mean response was calculated (see Table 6 and Appendix F) using *Strongly agree* = 4, *Agree* = 3, *disagree* = 2, and *Strongly Disagree* = 1.

$$Mean = \frac{number\ of\ Strongly\ Agree\ x\ 4\ +\ number\ of\ Agree\ x\ 3\ +\ number\ of\ Disagree\ x\ 2 + number\ of\ Strongly\ Disagree}{Total\ number\ of\ responses\ for\ each\ question}$$

Again, the survey item, "As EH&S leader, shaping the safety culture of my campus is part of my role" remained at the top, measured by the mean—suggesting the EH&S leaders' favorable perspective of safety culture.

Good safety culture leads to improved safety performance (Cooper, 2000, 2016; Naji et al., 2021). Fifty-two percent of EH&S leaders *strongly agree* the safety culture of their campus positively affects the health and safety outcomes. Thirty percent of EH&S leaders *agree* the safety culture of their campus positively affects the health and safety outcomes. Eighty-three percent of EH&S leaders *strongly agree* or *agree* the safety culture of their campus positively affects the health and safety outcomes. This result appeared well in agreement with Cooper's claim; however, only 10.5% of EH&S leaders *strongly agree* safety culture is a well-understood concept in their university. The result seems unexpectedly low until the realization that 53% of

EH&S leaders *agree* safety culture is a well-understood concept in their university, bringing the total to 63% of EH&S leaders who *strongly agree* or *agree* safety culture is a well-understood concept in their university.

Management and Leadership

Management and supervision are one of the safety culture characteristics of Cooper's (2000, 2016) reciprocal safety culture model. Twenty-six percent of EH&S leaders *strongly agree* campus leadership supports their EH&S operation through budget allocation, staffing, sponsorship, etc. Thirty-five percent of EH&S leaders *agree* campus leadership supports their EH&S operation through budget allocation, staffing, sponsorship, etc. Sixty-one percent of EH&S leaders *strongly agree* or *agree* campus leadership supports their EH&S operation through budget allocation, staffing, sponsorship, etc. This result reflected anecdotal evidence that EH&S does not receive sufficient support from upper management; however, the leadership involvement significantly improved during the COVID-19 global pandemic. The survey result shows that 59% of EH&S leaders *strongly agree* that senior leadership works with their department in the COVID-19 global pandemic response. However, while the participants give high marks to the higher education management and leadership for COVID-19 response, they have different views of the support they get from campus leadership. For example, only 26% of EH&S leaders *strongly agree* that the campus leadership supports their EH&S operation through budget allocation, staffing, sponsorship, etc.

EH&S Programs

EH&S programs outline a road map in conducting a specific duty that includes a written document, a training plan, and other details depending on the intended goal of the program. Only 9% of EH&S leaders *strongly agree* they are satisfied with their department's health and

safety programs. Still, 61% of EH&S leaders *agree* they are satisfied with their department's health and safety programs. Overall, 70% of EH&S leaders *strongly agree* or *agree* they are satisfied with their department's health and safety programs.

Audits and inspections are part of EH&S programs used to assess its performance in addition to being triggered by external compliance enforcement activities. Most importantly, audits and inspection are part of safety culture characteristics in Cooper's (2016) reciprocal safety culture model. Thirty percent of EH&S leaders *strongly agree* there is a positive relationship between EH&S audits and their effect on the EH&S program outcomes at their campus. Forty-eight percent of EH&S leaders *agree* there is a positive relationship between EH&S audits and their effect on the EH&S program outcomes at their campus. Seventy-eight percent of EH&S leaders *strongly agree* or *agree* there is a positive relationship between EH&S audits and their effect on the EH&S program outcomes at their campus. I had special interest on the topic of audits and inspections; as such, this study originally focused on audits and inspections, but landed on safety culture after many twists and turns.

Interview Findings

Eight of the EH&S leaders from 23 qualified participants volunteered for the interview and shared their lived experiences as EH&S leaders of complex organizations and made meaning out of their day-to-day activities (Merriam & Tisdell, 2015). The qualification for the interview was to serve currently as an EH&S manager or higher. Most of the interviewees were EH&S directors as initially intended and included a community college system EH&S manager and a vice president for safety, health, environment & risk management. Two of the participants have a teaching role in addition to their core responsibilities. Table 7 summarizes information on the EH&S leaders and includes the latest title, Carnegie characteristics, number of EH&S staff,

2019–2020 enrollment (rounded to nearest thousands to avoid identifiability), years of service as EH&S professionals in higher education, and the response to one of the survey items. The survey item provided a context in each participant's perspective on their role in shaping the safety culture of their campus.

Table 7
Interview Participants' Data

Participants/ title	Enrollment	Carnegie classification	Years of service	Number of staff supervised	Decision-making responsibility*
Participant 1 Director of Enterprise Risk Management and Environmental Health and Safety	7,000	Master's Colleges & Universities: Larger Programs	16	2 to 3	Strongly Agree
Participant 2 Director for Safety & Risk Management	11,000	Master's Colleges & Universities: Larger Programs	13**	4 to 7	Strongly Agree
Participant 4 Director EHS	16,000	Master's Colleges & Universities: Larger Programs	10	1 to 3	Agree
Participant 5 Environmental Safety Manager; Lecturer Occupational Health	3,000	Baccalaureate Colleges: Diverse Fields	32	1 to 3	Disagree
Participant 7 Assistant Director of Public Safety for Environmental Health and Safety	22,000	Associate's Colleges: High Transfer-High Traditional	10	1 to 3	Agree
Participant 12 Director of Safety Health & Sustainability	16,000	Master's Colleges & Universities: Larger Programs	23	8 to 11	Strongly Agree

(Table 7 Continued)

Participants/ title	Enrollment	Carnegie classification	Years of service	Number of staff supervised	Decision-making responsibility*
Participant 14 Assistant Director for Research Safety	53,000	Doctoral Universities: Very High Research Activity	35	> 15	No Response
Participant 15 Vice President for Safety, Health, Environment & Risk Management Professor of Occupational Health	5,000	Special Focus 4-Year: Research Institution	29	> 15	Strongly Agree

Note. *Response to survey item, *I am part of the top-level decision-making body of my campus in the pandemic response.*

Thematic analysis (Braun & Clarke, 2006; Creswell & Creswell, 2017) of interview data and the response from open-ended survey data of EH&S leaders of higher education in the United States provided the following themes: (a) Higher Education Safety Culture, (b) Higher Education Environmental Health and Safety Programs, (c) Higher Education Management's Role in Environmental Health and Safety Operations, and (d) Modus Operandi of Higher Education Environmental Health and Safety Leaders. Theme A and Theme B have two subthemes, and Theme C and Theme D have three subthemes as shown on Table 8.

Table 8
Themes

Theme	Subtheme 1	Subtheme 2	Subtheme 3
A. Higher Education Safety Culture	A1. Safety culture effort	A2. Safety culture concept	
B. Higher Education Environmental Health and Safety Programs	B1. Changing scope of EH&S	B2. Compliance	

(Table 8 continued)

Theme	Subtheme 1	Subtheme 2	Subtheme 3
C. Higher Education Management's Role in Environmental Health and Safety Operations	C1. The impact of the EH&S position in higher education organizational structure	C2. Impact of resources on EH&S operations	C3. Impact of COVID-19 on EH&S operations
D. Modus Operandi of Higher Education Environmental Health and Safety Leaders	D1. Relationship, trust, and communication	D2. EH&S leaders as consultants	D3. Brand, moto, and slogan

Higher Education Safety Culture

The research summarized in Chapter 2 showed the complexity of the concept of safety culture. It was not surprising to hear a variety of explanations of safety culture from the participants. However, the participants' descriptions or explanations of safety culture reflected one of the safety culture characteristics described by Cooper's (2000, 2016) reciprocal safety culture model. The six common safety culture characteristics are (a) management/supervision, (b) safety systems, (c) risk, (d) work pressure, (e) competence, and (f) procedures and rules. The functionalist views of safety culture, advocated by Cooper (2000, 2016), were reflected in the lived experiences of the EH&S leaders, as evidenced in their interviews.

Safety culture effort. The survey showed 100% of participants said shaping the safety culture is part of their role. The finding suggested participants strive to establish and maintain a good safety culture, which also corroborated the survey result. EH&S leaders are mindful and show effort in building a positive safety culture. Participant 5 explained safety culture in terms of the roles personnel play in the organization, and stated, "I think of myself as the operational part of the safety culture effort here and the 'president' more of the leadership—the strategic part

of this safety culture." This view of Participant 5 mirrors their response to the survey item included in Table 7. Participant 5 disagreed to being part of the top-level decision-making body of the campus COVID-19 pandemic response. But Participant 5's view adds to Cooper's reciprocal safety culture model that underlines the necessity of a collective effort by an organization to build a positive safety culture. However, the leaders also shared a common sentiment that they do not need to use the term "safety culture" during their operations. For example, Participant 2 responded to a follow-up question, "How often is 'safety culture' mentioned during your regular meetings?" with "Not as much." Participant 14 agreed, and said, "So we're doing the things that we need to without the buzzword of we're creating a culture, you know we're doing what we're doing, and we're creating the culture as a byproduct of what we're doing." Participant 14's use of the term "byproduct" was striking, because Cooper's (2000) reciprocal safety culture model established that the reciprocal interaction between situational, behavioral, and psychological aspects of safety culture results in a safety culture product.

Safety culture concept. Safety culture is not a straightforward concept, as several different definitions of safety culture exist in the literature (Cooper, 2016; Guldenmund, 2018; Le Coze, 2019a; Naji et al., 2021). However, there has been some consensus that safety culture is part of broader organizational culture (Cooper, 2016; Guldenmund, 2018). Still, some advocates of the interpretive view argue safety culture should be eliminated, and organizational culture should be used instead (Hopkins, 2018). Participant 12's view supported the functionalist perspective when they stated, "Yeah so I'm looking at starting to work our safety culture into a culture of care because they kind of make sense, right?" Participant 5 connected the structural aspect that safety culture is a subculture of organizational culture by saying, "The strength of the safety culture is determined by how well the health and safety office is able to

frame its work in terms of the mission of the institution." One would assume an institution's mission relates to its organizational culture.

Is safety culture good or bad, positive, or negative? These are common questions raised when talking about safety culture. Participant 15 shared a strong opinion on measuring good safety culture, saying, "I would argue, to maintain a good safety culture, that's kind of the main theme here is that you need to overtly measure client satisfaction not anecdotal complaints, but systematically measure it and so that's what we do."

The way the participants understood and expressed safety culture was diverse. For example, Participant 1 related safety culture with risk appetite, and stated, "To me, safety culture includes a risk management concept of "risk appetite", that is, how must risk or safety is the community willing to apply?" Risk is one of the safety culture characteristics in Cooper's (2016) reciprocal safety culture model. Others described it in terms of their functional aspect; Participant 2 stressed communication when they commented:

> Safety culture, and you know, I think that one of the things that we really realized was its communication. And how do we constantly get that in front of people, because I think that's imperative if it's not in front of you, you're not going to be thinking about it right. So, it's, it's a lot of that interaction with those departments, is the communication piece, and just always trying to make people aware of the safety hazards that are on the campuses.

Safety culture was mentioned by all participants several times except Participant 7. Participant 7 mentioned safety culture just once responding to the question, "How do you describe the safety culture of your campus?" Their answer included, "I would say the safety culture at the operational level is quite good."

Higher Education EH&S Programs

According to Barton and Shan (2017), "Safety encompasses a large swath of tasks, and it has tentacles that stretches into every aspect of manufacturing and research" (p. 32). In the

process of teaching, learning, and working, the tentacles that Barton and Shah refer to are diverse and complex. As explained in Chapter 1, EH&S programs are job- and campus-specific and are necessary as a guide in completing a task or a project. EH&S programs are documents that contain detailed outlines required to do a specific job safely, such as training, risk assessment, communication, incident management, audits/inspections, etc. The EH&S programs of higher education follow federal and state standards. During the interviews, the participants mentioned some of the EH&S programs that show the diversity and breadth of the topic. Table 9 shows these mentions by each participant at least once.

Table 9
EH&S Programs

Participant	Involvements in EH&S Programs
Participant 1	chemical hygiene program, environmental compliance, electrical safety program, injury and illness prevention program
Participant 2	emergency operation plans, safety program
Participant 4	emergency preparedness program, safety program
Participant 5	health and safety program, safety program
Participant 7	safety program, training program, health and safety program
Participant 12	hazardous materials and hazardous waste programs, occupational safety programs, food and sanitation programs, environmental programs, zero waste program, sustainability program, chemical inventory program, ergonomic program, COVID prevention programs
Participant 14	lab safety program, clinic safety program, ambulatory care program, sustainability program, hazardous waste program
Participant 15	safety program, biosafety program

Changing scope of EH&S. EH&S is a dynamic profession (Goetsch, 2019). There is a tendency of EH&S mission creep (Barton & Shan, 2017). Higher education EH&S has expanded in scope by adding prominent fields such as risk management and/or sustainability. It is not clear that this bundling has strategic reasoning nor is a money-saving scheme; however,

the participants of this study came from higher education with different scopes of responsibilities. Participant 1 seemed to enjoy the bundled structure. They stated:

> I like the ultimate structure of environmental health, safety or safety itself being the prominent word to describe EH&S. So that in a division that also has responsibilities like risk management safety comes first. Right now, I also have responsibility for business continuity, and not everyone sees that as fitting with safety. But I would at least put the spectrum of risk and EH&S together, and I do think those appear nicely together in the structure I have now.

Compliance. Internal EH&S audits and inspections are integral parts of EH&S programs. EH&S deal with external audits and inspections from the Occupational Safety and Health Administration (OSHA), and Certified Unified Program Agency (CUPA) that focus primarily on compliance issues. The participants had opposing opinions on the effect of such audits on EH&S program outcomes. Participant 12, in favor of the internal audits and inspections, stated, “I like to think that our internal audits or inspections that we do are more effective because when we do our audits, our annual audits or whatever the frequency is, that we do our own inspections, they're more educational.” But Participant 12 questioned the value of external audits by saying:

> I struggle with those audits because they're more compliance-based than risk-based, and you know, sometimes it's not important how many fire extinguishers were looked at or surveyed or inspected. What would be even more important is how many risk assessments were done, what were the final edits in that program, have you reviewed the programs, are the programs being reviewed by the employees. I think those are more intrinsic to defining your safety culture; those would be great tools, right?

Some participants used audits and inspection to their advantage, as expressed by Participant 2, who stated, “I love them. You know, it’s another tool in the toolbox to make sure that there’s that safety culture on campus, right, you know, and unfortunately, it’s more of a forced buy in.”

Safety/compliance police? There is a common misconception in higher education on the role of EH&S personnel. The participants showed determination to change the narrative that they are out to get those departments that are not incompliance with regulatory requirements. To that effect, Participant 1 said:

> It [EH&S] can be approached in a way that doesn't feel like you are a compliance monitor or an inspector or things that have a negative connotation to them, so my goal is to direct it is to help the culture in that I give it a positive tone.

EH&S leaders employed strategies to dispute the compliance police misconception. Participant 15 described:

> We are a service provider we're not the compliance police and I think that really cuts to this notion of maintaining a good safety culture is where people feel they can trust the safety program that they're there to help rather than trying to sneak around and find out what people are doing wrong, I think, is really, really important.

The misconception became evident during the COVID-19 global pandemic. Participant 1 explained, "For instance, to use a code example, nobody wants to be the mask police right now."

Higher Education Management's Role in EH&S Operations

Cooper (2000, 2016) put management and leadership in the center of his reciprocal safety culture model. The model is a functionalist approach to safety culture that reflects managers' and practitioners' points of view. Management and supervision (i.e., leadership) is one of the safety culture characteristics the model. Participants overwhelmingly echoed the importance of higher education top management and leadership in building a positive and effective safety culture. Participant 7 explained the importance of management support as, "With the health and safety program that I was trying to introduce, if I had had, a, you know, senior management on my side from the start, it would have been so much faster and so much easier."

Higher education function follows a discrete operation which is hierarchical and bureaucratic. EH&S professionals have to pierce through this bureaucratic structure to do their

job, so the support and cooperation from the top is necessary. As described by Participant 2, "It's an imperative part of creating and continuing a safety culture on a campus and anywhere, for that matter, you have to have the buy in from upper management your administration your campus President to make that."

Impact of the EH&S position in higher education's organizational structure. The impact of EH&S position in organizational structure on EH&S program outcomes was one topic about which the participants felt strongly. The position of EH&S in the higher education organizational chart is far removed from the leader of the organization. I directly asked participants what impact the position of EH&S might have on safety culture. Participant 4 responded:

> I think it should be like right up there, you know, it should be a direct report to that vice president, because as soon as you add a layer, you dilute conversations about budget, you dilute conversations about potential risk.

Participant 7 attributed the success of EH&S to how close it is to the top of the organizational chart, saying, "In senior management, the president of the college or the executive vice president, the provost, someone like that, are much more successful than operations where you're buried. I'm somewhat buried."

The effects of resources on EH&S operations. Across the interviews, the topic of resources was nearly unanimously important. Participant 4 said, "So yeah, money and staffing, I think are probably the two biggest things." The most scathing comment on the shortage of EH&S staffing came from the open-ended survey question response by Participant 23:

> We are a very small, progressive, and productive group of individuals that function as an incredible team. Unfortunately, our staffing is very inadequate for the jobs that we perform. This leads to a feeling of disrespect toward the jobs we do and carries a stigma of morale crushing as we do the necessary work that keeps staff, faculty, students, and visitors safe on our campus. It is frustrating to feel as if our group is here only to satisfy a check box and not for the vision that we see on a daily basis.

Participant 12 articulated the importance of resources for EH&S operations as "more staffing to cover the customer service expectation and increase salary for retention and recruitment of qualified candidates." The resources issue in the higher education EH&S departments was exacerbated during the COVID-19 global pandemic, as is discussed on the next section. COVID-19 code management fell on the shoulders of EH&S departments and required a dedication of copious amount of time and resources.

Impact of COVID-19 on EH&S operations. Most participants brought up the effect of COVID-19 on their operations from the start, which could roughly fall into one of three categories: overwhelming responsibility, impact on safety culture, and lessons learned.

Participant 1 described the first category as:

> It [COVID-19] has overwhelmed us at times, and that's the negative side. We have felt stressed out, overwhelmed and overworked – which can make some people feel like they want to quit. There has been a negative side to the workload for our small department.

At the same time, the pandemic brought high level of attention to what EH&S does. Participant 2 explained second category, the effect of COVID-19 on safety culture as:

> And keeping everyone safe specifically from contracting COVID so you're developing a safety culture. But it's very, very specific right? It's about making sure people are physically distancing and how do we communicate that and mask wearing and washing your hands and so we've changed a lot of the safety culture on our campus, but it's been a very narrow focus so maybe that's how you approach others, maybe you pick something okay.

Participant 15 reflected on the lessons learned from the pandemic in two ways. The first one was the need to prioritize the task on hand systematically. Participant 15 categorized the tasks during COVID-19 in to three types: (a) tasks that must be delayed, (b) tasks that must still be done as normal, and (c) tasks as a result of the pandemic. Participant 15 planned to publish their work soon. The second lesson learned according to Participant 15 is in the context of community safety. Participant 15 described this lesson learned from the COVID-19 global pandemic as:

> What they don't do is think about what about the stuff that comes in, from the community. Safety people go to an organization, and they do a personal risk assessment, you know they say what hazards or perils are present within this organization and then we will put systems in place to protect against those. Does that sound reasonable? I think they learned, an important lesson on that one. Gee, COVID came to town, Ebola came to town, . . . MERS, H7N9, SARS, West Nile virus, Dengue fever, Zika, and now COVID-19.

Modus Operandi of EH&S Leaders

The higher education EH&S operation requires access to nearly all areas of their institution. Higher education institutions are complex systems and vary in scope, size, and population. Success in this environment with limited resources, as described, could be a challenging endeavor; however, EH&S leaders employed creative strategies described in the following three themes.

Relationship, trust, and communication. To break barriers, enter silos of different departments, pass bureaucratic hurdles, and perform their jobs, EH&S leaders emphasized building relationships, gaining trust, and communicating effectively. Participant 14 explained this approach, and stated:

> As long as you're treating somebody as a person, you're building the trust you're building the rapport you're building that relationship. And that's where you're starting to develop a culture, because you're helping them, and they start to understand what you're doing.

Participant 5 emphasized communication by saying, "EHS is as much about communication and understanding people's needs before you suggest an answer to what you expect the question to be." Participant 4 added to the point and stated:

> It really requires us to be on top of our game, but also to develop those relationships, and get those people to see what needs to happen. And in the end, in some ways, I think that builds a better safety culture.

EH&S leaders as consultants. What does the campus community expect from EH&S? The answer depended on the person to whom the question was asked. As mentioned, some may

think the sole purpose of existence of EH&S is to find noncompliance and report them, whereas some may say EH&S is a department that helps the department do their job safely. The core task of EH&S (e.g., training on job-related, specific safety procedures) belongs to the person who leads the task. The name of principal investigator comes to mind. A principal investigator at the University of California, Los Angeles (UCLA) and the University of California was charged for not implementing a proper lab safety procedure according to the law after the death of a researcher (Kemsley, 2018), as mentioned in Chapter 1. The cases were settled; thus, safety is a systemic issue. Because EH&S is part of the system, it is reasonable to want to know the role of EH&S in such circumstances. EH&S leaders who participated in this study tried to define their role as consultants. Participant 12 put the responsibility of the community and the role of EH&S this way: "But what I'm doing with that is, I'm trying to get that communicated to all my stakeholders so that they understand what their responsibilities are, so we're meant to be a consultative arm versus a compliance arm." Reinforcing the consulting theme, Participant 4 explained their roles as "one is to oversee the safety programs that are in place. And then the other is to basically act as a consultant to the campus."

Brand, motto, and slogan. Some of the EH&S leaders use brands, mottos, and slogans to drive the point home in shaping the higher education safety culture. Participant 12 noted "sustaining the fingers and toes" in their communication with their campus community. Participant 12 stated, "But if you think about our safety culture, you know, my motto has always been to sustain the fingers and toes of my campus community."

Participant 1 reminded their staff (and reminded me) about care of the community they serve, and stated, "People don't care how much you know until they know how much you care."

Participant 1 believed genuinely caring about the health and safety of the campus community, at the same time, makes them know they are cared for.

Building a brand and standing out were also noted strategies used in developing and maintaining a good safety culture in higher education. Participant 14 stated:

> I have a relatively unique last name, as you see, which is kind of good because it stands out, it's easy to remember and it's not you know no offense to Smith and Jones, but it doesn't blend in with 50 other Smith and Jones, okay.

Building a brand might take time, but Participant 15 highlighted its importance as, "And another thing I'll tell you the other thing that's really, they need a brand. ... But I would argue, having that brand is really, really important."

Member Checks

Member checks are one of the tools used in a qualitative study "to ensure internal validity and credibility" (Merriam & Tisdell, 2015, p. 246). I sent participants the abstract and Chapter 4 to allow them to check the findings. In addition, I highlighted the quotes I used from the transcript for each participant. The summary of member check comments is presented in Table 10, along with the action I took based on the member checking.

Table 10
Member Check Comments

Participant	Comment/partial comment	Action
Participant 1	Very nice work! It is really interesting to read and will be helpful to others when it's done.	None
	Attached is the Participant doc with some comments from me, if it's possible to edit my quotes I gave you how I would rephrase it to make better sense to the reader. You have my permission to update my quotes with the new version.	Quotes edited
Participant 2	Congratulations! There is nothing I would change.	None

(Table 10 Continued)

Participant	Comment/partial comment	Action
Participant 4	Thank you for following up with me and giving me the chance to see this chapter. I don't have any suggested edits to the content attributed to me. I do however, think I need to work on saying "um" less often.	I asked Participant 4 if they wanted me to remove the "um" from their quote.
	Yes, you have my permission (and gratitude) to remove the "um's".	"um's" removed
Participant 5	Thanks for sharing your work. I have a few comments on the quotes attributed to me	Quotes edited
	Your comment after this quote assuming that the mission related to the organizational culture is an interesting question. Because of the power of the faculty to determine how they do their work, academia is a bottom up driven organization. My experience is that each faculty members will have a different relative mix of the teaching, research and service elements of their work and how it related to the institutional mission. For this reason, organizational cultures often become disconnected from the institutional mission statement.	None
	You say the Dr. Herran was acquitted in the UCLA trial. That is not my understanding. The settlement he agreed to include the requirements that he, among other things, * Acknowledge and accept responsibility for lab conditions * Make no public statements denying responsibility	I corrected the use of the word "acquitted" to reflect a settlement. Thank you, Participant 5!
Participant 7	Congratulations. I don't wish to make any changes	None
Participant 12	Thank you for providing this consideration. CONGRATULATIONS!!!!!!!!!!!!!!!!!!!!	Quotes edited and a typo corrected
	Please see attached for a comment and suggested edits. Good luck!	
Participant 14	Thank you for sharing this. I added a couple of edits. Mostly just comments.	Quotes edited Years of service corrected
	This was intriguing to read. Interesting about Covid. . . . I know you used my quote about my belief in "What's in it for me" rule as a motivator, but with this MDR Tb and Covid it is so true. Protect yourself and others, get vax'd, and live a restricted life for a while- but live. Then when you look at COVID- this got diluted. Many folks still don't believe it is an issue and would and won't wear masks, not vax'd, etc. We have lost the group help, and have gotten selfish, and many only do what they want, won't be inconvenienced by a mask or shot, etc. I firmly believe that "Darwin will win." The strongest, smartest, fastest, etc., will prevail. As a safety professional, it is our job to help those who are not the strongest, smartest, etc. Are we dumbing down the population by doing what we do???? Sorry—but I ranted and had a therapy moment that was triggered by your dissertation. . . . Thanks!	None

(Table 10 Continued)

Participant	Comment/partial comment	Action
Participant 15	Congratulations on getting this pushed over the goal line. All of the numbers and quotes look fine to me. By the way, we got that biosafety article accepted for publication—it's in press now.	None

Summary

In this chapter, I presented the results of the quantitative data and the findings of qualitative data. The survey results were presented in three categories: (a) Safety Culture, (b) Safety Programs, and (c) Management and Leadership. In addition, four major themes were identified in the qualitative data: (a) Higher Education Safety Culture, (b) Higher Education Environmental Health and Safety Programs, (c) Higher Education Management's Role in Environmental Health and Safety Operations, and (d) Modus Operandi of Higher Education Environmental Health and Safety Leaders. Each theme has two or more subthemes. In the next chapter, discussions and conclusions are presented that include implications of the study, results and findings related to research questions and the theoretical framework, recommendations, and reflection based on these results and findings.

CHAPTER 5: DISCUSSION AND CONCLUSION

Overview

This inquiry studied higher education environmental health and safety (EH&S) leaders' perspectives on safety culture and, by doing so, contributed to closing the academic literature gap. I used Cooper's (2000, 2016) reciprocal safety culture model as a theoretical framework and employed a mixed methods research design that led to answers to the following questions:

1. How do EH&S health and safety leaders shape the safety culture of higher education?
2. How do EH&S health and safety leaders of higher education explain the effect of the safety culture of higher education on health and safety program outcomes?

The mixed methods research design provided a comprehensive understanding of a phenomenon (Creswell & Creswell, 2017; Şahin & Öztürk, 2019; Schoonenboom & Johnson, 2017). In addition, Cooper (2016) referred to triangulation, a common method in mixed methods research as a means for cross checking, and stated:

> As such, given the appropriate measuring instruments, triangulation allows researchers to take a multi-faceted view of safety culture so that the reciprocal relationships between psychological, behavioral and situational factors can be examined with a view to establish antecedents, behaviour(s), and consequence(s) within specific contexts. (p. 120)

I chose a mixed methods research design because I believe in a pragmatic approach to problem solving and I was convinced both survey and interview data would yield better answers to the research questions than any single method. The mixing of qualitative and quantitative data in a convergent mixed methods design happens in the interpretive phase (Creswell & Creswell, 2017; Harrison et al., 2020).

The close-ended survey data served to describe the perspectives of EH&S leaders related to safety culture, management and leadership, and EH&S programs. The interview and open-

ended survey data were analyzed thematically (Braun & Clarke, 2006; Creswell & Creswell, 2017) using QSR NVivo software (see Appendix G), and Microsoft Excel worksheet, the data provided the following main themes: (a) Higher Education Safety Culture, (b) Higher Education Environmental Health and Safety Programs, (c) Higher Education Management's Role in Environmental Health and Safety Operations, and (d) Modus Operandi of Higher Education Environmental Health and Safety Leaders. In this chapter, the results and findings of the study are discussed in addition to addressing the research questions, presenting implications for practice, specifying recommendations for further research, and concluding with my reflection as researcher.

Discussion

The answers to the research questions were found in the qualitative and quantitative data. Most of the survey questionnaires and the interview questions were designed to address one or both research questions, directly or indirectly. The following sections discuss the results and findings that address the research questions.

Research Question 1 (RQ1): How Do Health and Safety Leaders Shape the Safety Culture of Higher Education?

Scholars at both ends of the safety culture concept debate spectrum have agreed safety culture is a subculture of organizational culture (Cooper, 2016; Guldenmund, 2018), except the likes of Hopkins (2018). The inability to develop a working theoretical framework that unifies the interpretive and the functionalist views of safety culture is rooted in the debate on the meaning of culture itself. However, findings of this study aligned with the functionalist side advocated by Cooper's (2000, 2016) reciprocal safety culture model. The quantitative data results (see Table 6) confirmed the assumption that EH&S leaders play a role in shaping the

safety culture of their campuses. One hundred percent of the higher education leaders *strongly agree* or *agree* that shaping the safety culture of their campus is part of their role. The answer to the logical question of how they play a role emerged from the themes of the qualitative data.

Theme A: Higher education safety culture. EH&S leaders orchestrated a collective effort of their schools to keep the campus community safe, stay compliant with regulatory requirements, and be good stewards of the environment. The role of the EH&S department requires reaching out to the staff, students, faculty, and community. Additionally, EH&S staff visit different areas of the campus for various EH&S-related activities. The EH&S leaders reflected that making the campus community do its part is a critical aspect of shaping the safety culture of their campus.

Theme B: Higher education environmental health and safety programs. Developing and implementing effective EH&S programs is the second crucial tool EH&S leaders use to shape the safety culture of their campuses. EH&S programs include, but are not limited to, written plans and procedures with training and implementation details crafted to address specific jobs. Participants reflected on many such programs. In addition, EH&S programs are part of the safety culture characteristics (Cooper, 2000, 2016).

Theme C: Higher education management's role in environmental health and safety operations. The EH&S leaders strove to bring higher education leadership and upper management aboard in their quests to shape the safety culture of their campus. EH&S leaders use different strategies to make that happen. For example, Participant 14 said, "We tried to convince them that this is what we need to do, and this is how we need help, and the what's in it for me for a manager or a vice president, or whoever." Participant 15 swore on data to secure higher education leadership's support, and stated, "Now that's a key linchpin for establishing a

good safety culture because upper management understands that, they, you know, we're in an environment of in God we trust, all others bring data."

Theme D: Modus operandi of higher education EH&S leaders. The last strategy by which EH&S leaders shape the higher education safety culture is essential and has many components, as indicated as subthemes of Theme D.

Subtheme 1: Relationships, trust, and communication. Each interview participant expressed the importance of building relationships with the campus community as a critical element of their operation; hence, relationships were a key aspect of their efforts in shaping the safety culture. Equally crucial to EH&S leaders was garnering trust from staff, faculty, and students. Participants also underlined the vitality of communication in shaping safety culture. The reciprocal safety culture model (Cooper, 2016) consists of psychological, situational, and behavioral aspects that reciprocally interact. The behavioral aspect of the model is in play in the expressions of EH&S leaders.

Subtheme 2: EH&S leaders as consultants. The EH&S leaders stressed that defining higher education EH&S professionals goes a long way in shaping the safety culture of higher education. To that effect, EH&S leaders emphasized EH&S's role primarily involves consulting, among other responsibilities.

Subtheme 3: Brand, motto, and slogan. Among strategies EH&S leaders used in shaping the safety culture was by building a brand—something that stands out and earns recognition by the community. Also, EH&S leaders created a motto or a slogan for self-motivation and continuous reminders.

Research Question 2 (RQ2): How Do Health and Safety Leaders of Higher Education Explain the Effect of the Safety Culture of Higher Education on Health and Safety Program Outcomes?

The answers to RQ2 were more elaborate from the quantitative data than the qualitative data. Nineteen of 23 (82.6%) of EH&S leaders *strongly agree* or *agree* the safety culture of their campus positively affects health and safety program outcomes. This result agreed with the belief that a good safety culture leads to improved safety performance (Cooper, 2000, 2016; Naji et al., 2021). As mentioned several times, higher education leadership and upper management are integral parts of the campus safety culture. As such, 60.9% of the EH&S leaders *strongly agree* or *agree* that campus leadership supports their operation through budget allocation, staffing, sponsorship, etc. In other words, 39.1% of the EH&S leaders *strongly disagree* or *disagree* the campus leadership supports their operation through budget allocation, staffing, sponsorship, etc. The consequence of this relatively high negative sentiment was reflected by another survey result, where 30.4% of the EH&S leaders *strongly disagree* or *disagree*, they were satisfied with their department's health and safety programs.

The qualitative data showed the lived experiences (Merriam & Tisdell, 2015) of EH&S leaders. The themes found in the qualitative data contained EH&S leaders' explanations of how their campus safety culture affected the EH&S program outcomes. For example, Theme C, Higher Education Management's Role in Environmental Health and Safety Operations, encompasses the essence of RQ2 because of the association between EH&S program outcomes and higher education leadership and commitment. Participant 7 expressed, "But campus leadership is critical. A major power, if you will, the Vice President or the President who supports you and is known to support you, you get a great deal more cooperation."

Connection With Theoretical Framework

Cooper's (2016) reciprocal safety culture model guided this study. Cooper's approach to safety culture earned the backing of researchers with the functionalist view, along with practitioners, managers, and prominent organizations (e.g., American Petroleum Institute and American National Standards Institute; Cooper, 2016). However, the safety culture concept is not without its share of academic debate on its legitimacy to hold a place in the English dictionary because of its linguistic fallacy and relationship to safety performance. The starkest criticism of the safety culture came from Hopkins (2018). Hopkins (2018) argued safety culture does not make sense as a phrase and suggested using a safe culture, generative culture, or culture of safety. Hopkins also claimed not all organizations have a safety culture; however, the findings in this study sided with Cooper (2000), evidenced by the participants' voices confirming a good safety culture is something they strive to nurture. To build and maintain a positive safety culture, individuals and organizations must put a goal-oriented, collective effort toward improving safety performance (Cooper, 2000, 2002, 2016). The participants overwhelmingly echoed the sentiment that good safety culture relates to improved safety performance. The reciprocal safety culture model includes psychological, behavioral, and situational aspects.

The safety culture characteristics in the reciprocal safety culture model could be altered to suit the operational necessities of an organization to function safely. According to Cooper (2016), safety culture "is a variable that can be frequently and regularly tracked over time (i.e., assessing the effort that people put into improving safety)" (p. 8). The findings of this study confirmed Cooper's conclusion; for example, management and leadership are crucial both in the reciprocal safety culture model and in the participants' views on health and safety outcomes. In the participants' views, EH&S programs could be effectively designed and implemented to keep

institutions healthy and safe, mirroring procedures and rules as one of the safety culture characteristics of the reciprocal safety culture model. Also, the behavioral aspect of the model manifested itself as Theme D, Modus Operandi of EH&S Leaders.

Le Coze (2019a) positioned views such as Cooper's (2016) and Hopkins's (2018) at opposite ends of a safety culture debate spectrum. He claimed the safety culture approach that advocates methods, programs, and models—such as maturity models (Behari, 2019—have steadily gained popularity. Cooper's reciprocal safety culture model falls in this category. One of the central themes identified in this research was higher education health and safety programs indicated alignment with the findings with the theoretical framework. Overall, the essence of the findings of this study agreed with Cooper's (2000) definition of the safety culture product, "that observable degree of effort with which all organisational members direct their attention and actions toward improving safety on a daily basis" (p. 115).

Implications

Participant 4 suggested it takes a community to build a positive safety culture and said, "I would say that the campus has a community orientation to a safety culture. It doesn't just think about individual safety, thinks about community safety." As a member of the community, higher education upper management and senior leadership have a vested interest in the health and safety of the campus community and a unique role in supporting EH&S operations, as a consequence contributing to building a positive safety culture. The study also showed the EH&S leaders asserted their main role involves shaping the safety culture of their campuses. Based on the findings and results of this study, combined with the reciprocal safety culture model (Cooper, 2000, 2016), the following implications are deductible and apply to EH&S professionals and higher education upper management and senior leadership.

EH&S Professionals

The role of EH&S leaders and professionals of higher education is unique and full of challenges. As EH&S leaders reflected in the interviews in this study, they noted success of higher education EH&S depends not only on the hard work of the EH&S leaders and their staff, but also on how in sync the campus community is with EH&S's efforts in building a positive safety culture. This study also identified strategies leaders applied to that effect. The methods were described in the emergent themes previously discussed. These themes include (a) orchestrating the campus community toward positive safety culture; (b) building and implementing effective EH&S programs; (c) bringing upper management and leadership aboard; (d) applying effective communication; (e) building trust; (f) defining one's role as a consultant; (g) standing out; and (h) creating a brand, motto, and slogan where possible. The takeaway is to employ the effort where it generates the best outcome, in agreement with Cooper (2016), suggesting organizations should focus 80% of their safety culture improvement efforts on behavioral and situational aspects (see Figure 6).

Higher Education Management and Leadership

In the reciprocal safety culture model (Cooper 2000, 2016), the theoretical framework that guided this study (i.e., management/supervision) takes a prominent position. All participants emphasized the necessity of upper management and leadership support to build and maintain a positive safety culture on the campus. I hope this work contributes to making higher education upper management and leadership understand their role in their campuses' safety culture and provide due support and actively participate.

Recommendations for Future Research

When I asked Participant 12 about faculty perceptions of EH&S, they suggested to get their perspective and said, “it would be really interesting and probably a really good point in your project to get the EH&S directors’ point of view, and then a faculty member’s point of view.” The response makes sense, but it was out of the scope of the study. Still, broadening the audience to students, faculty, and staff as reasonable candidates for further study will provide a more comprehensive understanding of the safety culture in higher education. Understanding each department's perspectives of campus safety culture and perception of EH&S operations will help customize the service and resources EH&S affords.

The survey data also provided valuable insight about higher education EH&S leaders operations; however, I wish I had been able to work with more data. Expanding the survey to include more EH&S leaders across the country will elaborate on EH&S operations, challenges, and sentiment. On a cautionary note, this study provides additional evidence that finding participants in a survey is frustrating; therefore, I suggest devising a realistic plan of how to find participants. I used my membership in CSHEMA as a source. If I had to do the study again, I would establish a rapport with the community by participating and contributing to the community discussion board early. The other strategy I would use is to connect to some well-known members and ask them to endorse the study on the discussion board.

Conclusion

Higher education EH&S leaders are professionals with diverse backgrounds and a safety-first mentality. This study adds to the academic knowledge base into which EH&S leaders can tap and opens a door for more research that will help make their professional lives easier. The study used Cooper’s (2000, 2016) reciprocal safety culture model as a theoretical framework.

The study results and findings specified methods and strategies where EH&S leaders should focus their efforts. Those findings were not new discoveries, but themes extracted from the leaders' lived experiences. The mixed methods research design delivered the expected richness in answering the research questions. The aim of the study, which was to explore higher education EH&S leaders' perspectives on safety culture, was achieved by surveying and gaining access to the lived experiences of eight outstanding EH&S leaders through one-on-one interviews.

Reflection

I started paying close attention to the EH&S profession after participating in a robust safety orientation on my first day at a new job, many years ago. After that, when an opportunity surfaced in a company I worked for to participate on the emergency response team, I volunteered to join. Next, I volunteered to serve as a safety committee member. After that, I participated in several EH&S-related trainings and took EH&S classes at UC Santa Cruz Silicon Valley Extension. I became the EH&S officer for a diagnostic company in the Silicon Valley and later served as academic health and safety specialist in one of the campuses of California's public university systems. Exposure to EH&S provided me with some insight into the inner workings of the profession and prompted me to contemplate focusing my dissertation on the topic. The lack of academic literature on the perspectives of EH&S leaders at institutions of higher learning in the United States made the decision to pursue this topic easier. Initially, I focused my research on EH&S directors of one of the largest regional 4-year university systems; however, the EH&S directors did not share my enthusiasm, and I could not secure enough volunteers. That challenge forced me to broaden the study to collect as much data as possible from all higher education institutions across the United States. The move was rewarding—a blessing in

disguise. In addition to interviewing seven outstanding EH&S leaders, I had the rare opportunity to interview one of the top speakers in the EH&S field; a researcher; writer, sought-after mentor; vice president for safety, health, environment and risk management; and professor of occupational health, with more than 10 credentials in addition to DrPH. After a few twists and turns, starting to talk to the EH&S leaders was a consolation and energizing. The experience was challenging at the beginning and fulfilling at the end.

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APPENDIX A: EH&S DIRECTOR JOB DESCRIPTION

Environmental Health and Safety Director Job Description

About the Position

The Director of Environmental Health and Safety (EH&S) manages, oversees, and coordinates all the activities and operations of EH&S. The EH&S Department supports students, employees (Faculty, staff, and student assistants) of the University.

The position is responsible for management and execution of EH&S regulatory responsibilities for the University in compliance with University policy, Campus policy, and applicable laws, regulations, and legal precedence as mandated by Federal, State, and governing agencies.

Responsibilities

Program management responsible for development, management, implementation and monitoring of university environmental health and safety programs.

These programs include but are not limited to:

- Environmental Programs: Hazardous, Universal, and Medical/biohazardous waste, Municipal Separate Storm Sewer System (MS4), campus Storm Water Protection Program (SWPP), Sanitary Sewer Management Plan (SSMP), Spill Prevention, Control, Countermeasure Plan (SPCC), Above ground Petroleum Storage Act (APSA), Hazardous Materials Business Plans, emergency generators permit.
- Health and Safety Programs: Injury and Illness Prevention Plan (IIPP), Workplace incident investigations and follow up, Hazard Communications, Electrical Safety, Fall Protection, Indoor Environmental Quality, Confined Space, Lead, Hazardous Energies Control, Asbestos, Blood Borne Pathogens, Aerosol Transmissible Disease, Respiratory Protection, Personal Protective Equipment, Hearing Conservation, Traffic and Pedestrian Safety, Vehicle Safety, Industrial Trucks, Medical monitoring and surveillance, Pesticide, Fire, life safety, Emergency Management.
- Laboratory Safety Programs: Lab Safety & Chemical Hygiene Plan consisting of Radiation Programs for radioactive materials and equipment, Diver Safety, Controlled Substances, Blood borne Pathogens and Biosafety.

* Functions as the university's regulatory agencies contact. Monitor regulatory changes and updates on a continual basis and implement modifications necessary to maintain compliance.
* Serve as Legally Responsible Officer/Person for the SWPP/MS4 Program and the SSMP.
* Support Risk Management by providing campus safety assessments and incident investigations.
* Work with Risk Manager and Internal Auditor to evaluate and mitigate loss exposures.
* Work with Workers' Compensation on safety related issues for employees.
* Play key role in emergency management team by working with Emergency Management Coordinator. Serve as backup Safety Officer in the campus Emergency Operations Center.

* Provide support for maintenance and implementation of the Lab Safety & Chemical Hygiene Plan.
* Serve as Radiation Safety Officer (RSO) or Associate RSO, Biosafety Officer, and Chemical Hygiene Officer.
* Implement, track and maintain laboratory software (Chemical Inventory, Laboratory inspections, Lab Hazard Assessments, and online Safety Data Sheet software) supporting the Lab Sciences faculty and staff to ensure compliance with applicable regulations.

Requirement

* Bachelor's degree from an accredited institution of higher education in relevant field of study such as environmental health science, industrial hygiene, safety engineering, chemistry, biology is required.
* Seven years of experience in progressively responsible positions in environmental health and safety or related field.
* Detailed knowledge of environmental engineering principles, occupational health and safety sciences and chemical and biological process safety (e.g., chemistry, radiation, physics, toxicology, industrial hygiene, biological safety, environmental permitting).
* Knowledge of risk management principles, processes and tools, and ability to partner with university administrators to implement effective control and mitigation for biological, chemical, and physical hazards.
* Detailed knowledge and demonstrated effective experience working with applicable federal, state, and local safety laws and regulations, including awareness of current issues that may impact the university.
* Experience developing effective working relationships with governmental and regulatory agencies.
* Strong oral and written communication skills.
* Must be able to lift 20 lbs., walk on uneven surfaces in all areas of the campus including undeveloped locations (steep slopes, unpaved surfaces), building roofs, ladders, confined spaces, theater catwalks, etc. Must be able to wear a negative pressure full-face respirator.
* Ability to supervise others including outside contractors and consultants.
* Must be able to respond to emergency situations during nonbusiness hours.

Preferred Skills and Knowledge

* Master's degree in related field.
* Experience in Emergency Management and Operations
* One or more of the following certifications: Certified Hazardous Materials Management (CHMM), Certified Industrial Hygienist (CIH), or Certified Safety Professional (CSP).

Obtained from EH&S Director job posting

APPENDIX B: RESEARCH INVITATION

Dear EH&S Leader,

I am pursuing a Doctorate in Education in Innovation and Leadership at University of the Pacific, Benerd College. I chose to study the safety culture in higher education from the EH&S leaders' perspective for my dissertation topic because of my passion for the environmental health and safety profession.

I humbly ask for your participation in the survey and interview. I hope you are interested in this research's success because the study is all about your experience as an EH&S leader. The interview will be via Zoom amid pandemic guidelines and audio recorded. The audio will be transcribed. Your name, the name of your campus, and any other identifiable personal characteristics will not be published. You may withdraw your participation at any time because you are voluntarily participating. However, your participation is crucial and greatly appreciated.

The survey will take about 20 minutes and the interview will take about 1 hour. If you participate in the interview, there will be a follow-up discussion to check the transcript's accuracy that will take less than 30 minutes.

Please contact Zenebe Asfir at xxxxx@u.pacific.edu or [redacted] to participate in the interview.

Thank you!

APPENDIX C: RESEARCH PARTICIPANT CONSENT FORM

UNIVERSITY OF THE PACIFIC

Research Participant Consent Form

Research Title: The Health and Safety Directors' Perceptions of Higher Education Safety Culture

Lead Researcher: Zenebe Asfir

Faculty Advisor: Dr. Rod Githens

RESEARCH DESCRIPTION: You are being invited to voluntarily participate in a dissertation research study on higher education safety culture. The purpose of this inquiry is to study the higher education health and safety directors' perspectives on safety culture in the United States. You will be invited to participate in a survey and interview. During the interview proceeding, audio or video recording will be used to assist the researcher gather and document information. Information collected during the interview will be used solely by the researcher to complete this dissertation and research project. If you prefer to not be audio or video recorded, handwritten notes will be taken by the researcher during the interview.

TIME INVOLVEMENT: Your participation will take approximately 20 minutes to 90 minutes depending on your participation in the survey, interview, or both.

RISKS AND BENEFITS: There is no known risk beyond those experienced in everyday living. Because of the prevalence of COVID-19, the interviews will be conducted via virtual methods such us videoconferencing. There are no known benefits to be expected as a result or your participation in this study.

COMPENSATION: You will receive no compensation or payment for your participation.

PARTICIPANT'S RIGHTS: If you have read this form and have decided to participate in this research project, you understand that your participation is entirely voluntary and your decision whether or not to participate will involve no penalty or loss of benefits to which you are otherwise entitled. If you decide to participate, you are free to discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. You have the right to refuse to answer particular questions. The results of this research study may be presented at scientific or professional meetings or published in scientific journals. It is possible that we may decide that your participation in this research is not appropriate. If that happens, you will be dismissed from the study. In any event, we appreciate your willingness to participate in this research.

CONFIDENTIALITY: Your identity will not be disclosed. Your identity will not be made known in written materials resulting from the study. Artificial or fictitious names and identities may be used to describe participants to attempt to maintain confidentiality.

UNIVERSITY OF THE PACIFIC

CONTACT INFORMATION:

Questions: If you have any questions, concerns or complaints about this research, its procedures, risks and benefits, contact the Lead Researcher at [redacted] or by email at [redacted] or the Faculty Research Advisor, Dr. Rod Githens at [redacted].

Independent Contact: If you are not satisfied with how this study is being conducted, or if you have any concerns, complaints, or general questions about the research or your rights as a participant, please contact Office of Research and Sponsored Programs to speak to someone independent of the research team at (209)-946-3903 or IRB@pacific.edu.

By proceeding with the interview your consent is implied.

APPENDIX D: SURVEY PROTOCOL

The purpose of this inquiry is to study the higher education health and safety leaders' perspective on safety culture. This project is to collect data I will use in my research in partial fulfillment of the Doctor of Education degree requirement at the University of the Pacific.

The survey will take about 20 minutes. I appreciate your willingness to share your thoughts by completing the survey. Your name, the name of your campus, and any other identifiable personal characteristics will be kept confidential.

The following statements are about the safety culture at your campus. Please choose what represents your opinion.

1) Campus staff demonstrates a positive attitude toward my environmental health and safety (EH&S) operation, such as safety training, inspections, and audits in their area.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree
2) Campus faculty demonstrates a positive attitude toward my EH&S operation, such as training, inspections, and audits in their department.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree
3) Students demonstrates a positive attitude toward my EH&S operation, such as safety training, inspections, and audits.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree
4) Campus management demonstrates a positive attitude toward my EH&S operation, such as training, inspections, and audits in their department.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree
5) The campus leadership supports my EH&S operation through budget allocation, staffing, sponsorship, etc.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree

6) As EH&S Director, shaping the safety culture of my campus is part of my role.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree
7) Safety culture is a well understood concept in my campus.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree
8) The safety culture of my campus positively affects the health and safety outcomes of my campus.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree
9) I believe the university leadership sets the tone for safety culture of my campus.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree
10) There is a positive relationship between EH&S audits and their effect on the EH&S program outcomes at my campus.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree
11) If your Campus is part of a university system: Systemwide safety culture affects the safety outcomes of my campus.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree
12) I am satisfied with my department's health and safety programs.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree
13) My role in the campus COVID-19 decision-making process has been significant.
   a) Strongly Disagree
   b) Disagree
   c) Agree
   d) Strongly Agree
14) I am part of the top-level decision-making body of my campus in the pandemic response.
   a) Strongly Disagree

b) Disagree
c) Agree
d) Strongly Agree

15) My campus did a good job in the initial COVID-19 pandemic response.
a) Strongly Disagree
b) Disagree
c) Agree
d) Strongly Agree

16) Senior leadership works with my department in COVID-19 pandemic response.
a) Strongly Disagree
b) Disagree
c) Agree
d) Strongly Agree

17) I am satisfied with my campus's overall pandemic response.
a) Strongly Disagree
b) Disagree
c) Agree
d) Strongly Agree

18) I would do things differently in the overall COVID-19 pandemic response if I had enough authority.
a) Strongly Disagree
b) Disagree
c) Agree
d) Strongly Agree

19) Your current title and how long
a) Director
b) Interim Director
c) Other, Specify _____
d) How long _____

20) Anything you want to add that you think will help strengthen your campus's health and safety program?

21) What is the total number of your staff?

22) Are you willing to participate in a more in-depth discussion about this topic through an interview?
a) Yes
b) No

23) If Yes to #22
a) Best number to call _____
b) Email _____

APPENDIX E: INTERVIEW PROTOCOL

Introduction

Welcome, and thank you for agreeing to participate in the project and for making the time for this interview. The purpose of this inquiry is to study the higher education health and safety leaders' perspective on safety culture.

This project is to collect data that I will use in my research in partial fulfillment of the Doctor of Education degree requirement at the University of the Pacific. The interview will take about 1 hour. I will audio record the interview. I will invite you for a shorter meeting for verification of the transcript at a later date. Your name, the name of your campus, and any other identifiable personal characteristics will be kept confidential. Do you have any questions before we start?

Questions

We are going to talk about your role, the general safety culture, and the COVID-19 pandemic response on your campus.

1) Tell me about your role and how long you have been with your campus.
2) Describe the operation of the Environmental Health and Safety (EH&S) department on your campus.
3) What are the perceptions of faculty, staff, and management on the health and safety programs?
4) Describe your role in shaping the safety culture of your campus.
5) How do you describe the safety culture of your campus?
6) What do you think about the role of campus leadership on safety culture?
7) What is the relationship between safety audits and their effect on the EH&S programs at your campus?
8) What is/was the impact of the COVID-19 pandemic on your operation?
9) What was your role in your campuses' decision-making process in addressing the COVID-19 pandemic?
10) What were the most important lessons learned for EH&S from the pandemic?
11) What is most critical for an effective health and safety program at your campus?
12) What should be changed to make the EH&S department more successful?
13) What is the impact of management, organizational structure, and bureaucracy on the effectiveness of the EH&S operations?

Closing

Is there anything you want to add that you think was not covered in this discussion?

I greatly appreciate your participation in this project. Please contact me if you have anything else you want to add after this meeting ends or if you have any questions about the study.

Thank you!

APPENDIX F: SURVEY RESULT – SORTED BY MEAN

Survey item	Strongly Agree (4)		Agree (3)		Disagree (2)		Strongly Disagree (1)		Mean	SD	Total
As EHS Director, shaping the safety culture of my campus is part of my role.	69.6%	16	30.4%	7	0.0%	0	0.0%	0	3.7	1.31	23
My campus did a good job in the initial COVID-19 pandemic response.	69.6%	16	21.7%	5	8.7%	2	0.0%	0	3.6	1.28	23
I am satisfied with my campus's overall pandemic response.	56.5%	13	39.1%	9	4.3%	1	0.0%	0	3.5	1.06	23
Senior leadership works with my department in COVID-19 pandemic response.	59.1%	13	27.3%	6	13.6%	3	0.0%	0	3.5	0.91	22
The safety culture of my campus positively affects the health and safety outcomes of my campus.	52.2%	12	30.4%	7	17.4%	4	0.0%	0	3.3	1.06	23
My role in the campus COVID-19 decision-making process has been significant.	54.5%	12	18.2%	4	27.3%	6	0.0%	0	3.3	0.85	22
Campus staff demonstrates a positive attitude toward my environmental health and safety (EHS) operation, such as safety training, inspections, and audits in their area.	34.8%	8	56.5%	13	8.7%	2	0.0%	0	3.3	0.94	23
Campus management demonstrates a positive attitude toward my EHS operation, such as training, inspections, and audits in their department.	30.4%	7	65.2%	15	4.3%	1	0.0%	0	3.3	0.94	23

Survey item	Strongly Agree (4)		Agree (3)		Disagree (2)		Strongly Disagree (1)		Mean	SD	Total
Students demonstrate a positive attitude toward my EHS operation, such as safety training, inspections, and audits.	22.7%	5	72.7%	16	4.5%	1	0.0%	0	3.2	0.82	22
Campus faculty demonstrates a positive attitude toward my EHS operation, such as training, inspections, and audits in their department.	26.1%	6	60.9%	14	13.0%	3	0.0%	0	3.1	0.67	23
There is a positive relationship between EHS audits and their effect on the EHS program outcomes at my campus.	30.4%	7	47.8%	11	17.4%	4	4.3%	1	3.0	1.01	23
I believe the university leadership sets the tone for the safety culture of my campus.	36.8%	7	26.3%	5	31.6%	6	5.3%	1	2.9	0.47	19
If your campus is part of a university system: The system-wide safety culture affects the safety outcomes of my campus.	36.8%	7	26.3%	5	31.6%	6	5.3%	1	2.9	0.57	19
I am part of the top-level decision-making body of my campus in the pandemic response.	36.4%	8	27.3%	6	22.7%	5	13.6%	3	2.9	0.79	22
The campus leadership supports my EHS operation through budget allocation, staffing, sponsorship, etc.	26.1%	6	34.8%	8	34.8%	8	4.3%	1	2.8	0.58	23
I am satisfied with my department's health and safety programs.	8.7%	2	60.9%	14	26.1%	6	4.3%	1	2.7	0.58	23
Safety culture is a well-understood concept in my university.	10.5%	2	52.6%	10	31.6%	6	5.3%	1	2.7	0.65	19

Survey item	Strongly Agree (4)		Agree (3)		Disagree (2)		Strongly Disagree (1)		Mean	SD	Total
I would do things differently in the overall COVID-19 pandemic response if I had enough authority.	8.7%	2	17.4%	4	56.5%	13	17.4%	4	2.2	0.42	23

APPENDIX G: CODES, NVIVO