ASSESSING HEALTH AND SAFETY CONDITIONS IN THE BUILDINGS AT AN INSTITUTION OF HIGHER LEARNING IN SOUTH AFRICA: A CASE IN THE FREE STATE PROVINCE

by

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DECLARATION OF OWN WORK

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ABSTRACT

Higher education institutions (HEIs) in South Africa are mandated to provide safe, hazard-free learning and working environments. Yet, evidence increasingly suggests a gap between legislative requirements and actual safety conditions within campus buildings. This master's study investigated this problem by assessing the health and safety compliance of buildings at a selected institution in the Free State province, identifying prevalent hazards, and determining the factors influencing compliance. The study aimed to evaluate the current state of health and safety conditions, guided by five objectives: identifying compliance-enhancing components, examining occupational hazards, determining factors associated with compliance and non-compliance, assessing compliance levels, and evaluating the effectiveness of existing control measures.

An exploratory sequential mixed-method design was employed, incorporating surveys with 372 students and 235 staff, interviews with health and safety professionals, and Environmental Health and Safety (EHS) audit checklists across eight buildings. Data were analyzed using descriptive statistics, chi-square tests, regression modelling, and thematic analysis.

Findings revealed partial compliance, with buildings scoring between 45% and 67% on checklist assessments. Major deficiencies included expired fire extinguishers, blocked exits, poor ventilation and lighting, weak waste management, and inadequate signage. Students showed low safety awareness: only 22% were trained, and 40.1% had never received safety communication. Staff demonstrated moderate awareness (mean ≈ 3.1/5), yet only 14.5% were fully compliant. Regression analysis showed that institutional support was the strongest predictor of compliance. Interviews highlighted deteriorating infrastructure, weak leadership commitment, fragmented communication, and reactive rather than preventive safety practices.

The study concludes that although policies align with national legislation and ISO 45001 principles, implementation remains inconsistent owing to systemic deficiencies in leadership, infrastructure, communication, and resource allocation. Strengthening management accountability, institutionalizing continuous training, improving hazard communication, and adopting a proactive risk-based maintenance system are recommended to achieve sustainable compliance and safer campus environments.

Keywords: Building safety, Emergency preparedness, Health and safety compliance, Occupational hazards, Safety culture

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LIST OF ABBREVIATIONS AND ACRONYMS

COVID-19: Coronavirus disease

CUT: Central University of Technology

HEI: Higher educational institution

HSE: Health, safety, and environment

HSR: Health and safety representative

ILO: International Labor Organization

ISO 45001: Occupational Health and Safety Management Systems – Requirements with Guidance for Use

ISO: International Organization for Standardization

NBR: National Building Regulations

NBRBSA: National Building Regulations and Building Standards Act

OHS: Occupational health and safety

OHSA: Occupational Health and Safety Act

OHSMS: Occupational Health and Safety Management Systems

PDCA: Plan-Do-Check-Act

PPE: Personal protective equipment

SHE: Safety, health, and environment

SMS: Safety management system

UCT: University of Cape Town

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DEFINITION OF TERMS

Occupational Health and Safety – Occupational Health and Safety (OHS) is defined as a multidisciplinary field encompassing the well-being, safety, and health of individuals in a workplace setting (Rotaru and Cioca, 2024).

Higher Educational Institution - According to Altbach, Reisberg, and Rumbley (2009), a higher educational institution delivers tertiary education and performs considerable research. Also, these institutes provide undergraduate and postgraduate studies and focus on research and development**.**

Occupational Health, and Safety Management Systems - According to the ISO 45001:2018, they are frameworks that are used to improve employee safety, reduce workplace risks, and improve working conditions worldwide. They are a structured set of interrelated or interacting elements used to establish policies, objectives, and processes to ensure worker safety and health and to demonstrate that the organization's policies, procedures, systems, and processes are followed (Çalış and Büyükakıncı, 2019).

Occupational Health and Safety Act - This is legislation that regulates the health and safety of workers in South Africa. This is achieved by establishing comprehensive duties and requirements for employers as well as rights and duties for workers to create a safe working environment and prevent occupational incidents and diseases (Republic of South Africa, 1993).

Health and Safety Compliance – This term refers to the extent to which an institution adheres to occupational health and safety legislation, regulations, policies, and established safety standards in order to ensure a safe working and learning environment (Rotaru and Cioca, 2024).

Building Safety – This refers to the condition and management of physical infrastructure to ensure that buildings are structurally sound, free from hazards, compliant with safety regulations, and safe for occupants (Hall and Greeno, 2023).

Risk Assessment – This comprises a systematic process of identifying hazards, evaluating the likelihood and severity of potential harm, and implementing appropriate control measures to minimise or eliminate risks (Ostrom and Wilhelmsen, 2019).

Hazard – This refers to any source, situation, or act with the potential to cause injury, ill health, damage to property, or environmental harm (Smith et al. 2023).

Safety Management System (SMS) – This is a structured framework of policies, procedures, and practices implemented within an organisation to identify hazards, manage risks, and continuously improve safety performance (Khalid et al. 2021).

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Plan–Do–Check–Act (PDCA) Cycle – A continuous improvement model used in management systems, including occupational health and safety, consisting of planning actions, implementing them, monitoring performance, and taking corrective measures is known as the PDCA cycle (Tsopa et al. 2025).

University Buildings – These consist of the academic, administrative, and support infrastructure within a HEI that are utilized by staff and students for teaching, learning, and operational activities (Neuman, 2013).

Stakeholders – Individuals or groups with an interest in or affected by health and safety practices within the institution are the stakeholders. They include students, staff, management, and health and safety personnel (Osei-Asibey et al. 2021).

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CHAPTER 1: RESEARCH BACKGROUND

1. Introduction

Buildings are among the most important investments for any higher education institution (HEI), serving as meeting points for students, lecturers, and the community (Nadzim and Taib, 2014). In view of the foregoing, HEIs are obliged to maintain a safe environment where academic learning should take place (Deardorff et al. 2012). Buildings constitute the bulk of built infrastructure and play a pivotal role in a country's socioeconomic development. Most buildings are designed to last for several decades and to serve residential and functional purposes for many inhabitants throughout their design life. Over this period, buildings are subjected to several natural disasters, such as earthquakes, hurricanes, and tsunamis. In addition, man-made hazards such as fire and explosions can cause partial or complete collapse of the building and incapacitate building operations. Such destruction or incapacitation in the event of a hazard can jeopardize the health and safety (H&S) of inhabitants and cause significant direct and indirect monetary losses. Thus, buildings are designed to withstand anticipated hazards to ensure life and structural safety throughout their design life (Kodur et al. 2019). Considering the above-mentioned issues, health, well-being, and safety within the HEI infrastructure are critical needs for all employees, students, and the community at large.

In order to provide total safety for buildings, implementing key measures that include reliable fire protection systems, proper regulation and enforcement of building code provisions, enhancement of public awareness, and proper use of technology and resources are key to mitigating fire hazard in buildings (Kodur et al. 2019). According to the OHS Act section 8 (1), each organization should provide and uphold a working condition that is harmless and without hazard to the well-being and safety of their workforce (Republic of South Africa, 1993). The safety of building is the practice of designing, constructing, operating, maintaining, and removing buildings in ways that no one experiences deteriorated health, suffers injuries, or dies owing to the use of the building (Drukis et al. 2017). Meanwhile, the question remains: Do HEI buildings comply with H&S standards as required by law? This question is essential as compliance is the process that confirms whether the building design meets the required standard (Ou and Thygerso, 2012).

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The subject of H&S in existing buildings covers a wide spectrum of issues, including a safe environment, safe working conditions, and reactions of students and employees to health and safety-related issues. In addition, there needs to be H&S compliance, government support, and emergency preparedness in building facilities. Addressing these entails a critical OHS programme that involves risk identification, risk analysis, risk evaluation, and risk treatment (Gan, 2019). Most HEIs will probably have similar work processes and sources of hazards (Dimitrijevic and Dakic 2014). Therefore, the concepts of risk assessment and management relate to hazards and/or harmful factors in the working environment, which underpin most organizations OHS policies. Okeke-Uzodike (2021) asserts that risk assessment is vital as it identifies potential hazards and foresees the probability of incidents occurring in the workplaces also taking into consideration the remedial actions.

A recent review of the coronavirus disease (COVID-19) pandemic has shown that workplaces are a concern because they could act as transmission hubs for a virus. Therefore, ongoing research on occupational health and safety (OHS) is needed to improve its effectiveness, especially during the COVID-19 pandemic (Okeke-Uzodike, 2021) and in the post-COVID-19 era. The first COVID-19-related death in South Africa was reported on 27 March 2020. This occurred 12 days after the national state of disaster was declared on 15 March 2020. The declaration included immediate travel restrictions and the closure of schools, starting on 18 March 2020 (Van Schalkwyk, 2021). The closure of all South African HEIs and the suspension of the academic calendar led to a shift toward online teaching and learning to support recovery and continuity of the academic programe. This move received mixed reactions, raising discussions and debates about whether South African institutions were ready to respond effectively to the disruptive effects of COVID-19 on teaching and learning practices (Naidoo and Cartwright, 2022). Additionally, COVID-19 posed a new challenge for HEIs.

Communication research is well-suited to examining OHS issues in organisations, as many workplace injuries and incidents may be related to communication challenges and lapses (Schulte et al. 2018). Therefore, continuous research on reviewing H&S compliance in HEIs' existing buildings through risk identification, analysis, evaluation, and treatment is necessary to improve the implementation and compliance with OHS practices.

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This research conducted a comprehensive investigation into current H&S dynamics within HEIs. The research was primarily centred in the Free State Province, which is known for its distinctive combination of urban and peri-urban higher education settings. The objective of the study was to examine and analyse the explicit and subtle aspects of OHS inside educational infrastructures. Booysen's (2018) work highlights the links between the qualitative features of educational settings. This includes their H&S measures, as well as the academic and social-emotional outcomes of the people in these spaces.

It is important to recognize that management systems put in place for OHS, as highlighted by the British Standards Institution (2007), are essential for identifying and minimizing the risks tied to workplace hazards. These systems also foster a safe, secure, and supportive environment for both learning and working (International Organisation for Standardisation [ISO], 2018). As a result, this study goes beyond merely identifying the current OHS situation in the HEI located in the Free State province. Its objective was to construct a comprehensive narrative that integrates empirical evidence, legislative frameworks, and practical circumstances, with the aim of improving and maintaining OHS standards in South Africa's higher education sector.

2. Problem Statement

The intersection of scholarly achievement and the state of infrastructure in terms of H&S emerges as a pressing issue that warrants careful examination. The requirement to create a safe, hygienic, and supportive environment for educational, instructional, and professional activities is supported by various legal frameworks, particularly the National Building Regulations and Building Standards Act (Republic of South Africa, 1977) and the Occupational Health and Safety Act (Republic of South Africa, 1993). However, there seems to be a clear gap between these legal frameworks, their implementation, and the actual H&S conditions found in higher education institutions. Although there haven't been releases of the reliable stats relating to the compliance of university buildings, Morgan (2025) asserts that non-compliance relating to health and safety training decreased by 16%, although training remained one of the areas with the greatest number of deficiencies. Research by Gyekye and Salminen (2009) revealed that students' perceptions of safety at South African universities are significantly influenced by both the visible and perceived safety measures and protocols established by these institutions. Given the crucial role that educational institutions play in

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shaping the future generation and their impact on a nation's overall development, it is essential that they adhere to the health and safety regulations. The goal of this research was to thoroughly investigate the health and safety conditions within the buildings of university in the Free State Province of South Africa. The research sought to reveal the complexities, obstacles, and potential discrepancies in regulatory compliance, actual execution, and the real-life experiences of individuals within these structures.

3. Research Questions

This section outlines the research questions that underpin the study

3.1 Research Questions

- What are the components of H&S that contribute to improved compliance within the buildings?
- What are the occupational hazards present in the buildings at the HEIs?
- What are the factors associated with compliance and non-compliance with H&S standards within the buildings?
- What is the state of H&S compliance in the buildings of the HEIs?
- What is the effectiveness of existing control measures on compliance with H&S standards?

4. Aim of the study

The overall aim of this study was to evaluate compliance with H&S standards in the buildings of selected institution of higher learning and to make recommendations for improvement.

4.1. The Objectives of the Study

- To identify key components of H&S that enhance compliance within the buildings;
- To investigate the existing occupational hazards in the building of the selected institution of higher learning:
- To determine the factors associated with compliance and non-compliance with H&S standards within the buildings;
- To assess the current compliance status of existing buildings at the selected institution of higher learning; and

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- To assess the effectiveness of the existing control measures on compliance with H&S standards.

5. Delimitation

This study was limited in its focus on evaluating health and safety conditions, especially in the institutional structures in the Free State province, South Africa, as depicted in Figure 3.1. The study was limited in its geographical scope, which allowed a critical examination of the status of H&S regulations at the institution in Bloemfontein. The study focused on selected lecture rooms, student residences, cafeteria, and library at the institution. Only selected staff members and students from the targeted buildings were included in the study population. This concentrated geographical focus enabled a detailed examination of issues, adherence to rules and regulations, and implementation of safety measures that are unique to establishments in this province. By specifically focusing on the Free State province, the study sought to provide valuable insights to stakeholders in the region, including education institutions, government bodies, and safety professionals.

Moreover, the research sought to address issues affecting H&S in these buildings, including infrastructure support, emergency preparedness, and the effectiveness of the safety management system. The criteria for selecting this institution within the Free State province will ensure that the study has a feasible, inclusive sample for a thorough examination, given the variety of the institution's buildings. The expected outcomes of this case study were to identify areas of concern, provide suggestions for improvement, and, perhaps, serve as a blueprint for other provinces in South Africa grappling with comparable challenges in ensuring safe learning environments.

Moreover, the research administered questionnaires to end users of the university's facilities, including students and staff. This questionnaire aimed to collect firsthand experiences, perceptions, and observations concerning the H&S conditions in these buildings. The incorporation of end-users' opinions in this research is intended to create a comprehensive understanding of the H&S practices and conditions prevalent in the Bloemfontein campus of the institution of higher learning in the Free State, by focusing on this institution and incorporating the opinions of H&S practitioners and end-users.

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6. Justification of the Study

The overall aim of this study was to evaluate compliance with H&S standards in the buildings of selected institution of higher learning and to make recommendations for improvement. This necessitates a comprehensive assessment of the structural soundness, fire prevention measures, lighting, air circulation, and overall environmental and occupational welfare of educational structures to verify adherence to the relevant regulatory frameworks, particularly the National Building Regulations and Building Standards Act (Republic of South Africa, 1977). The results of this research are expected to yield significant insights that will benefit various stakeholders. These results are expected to benefit H&S, leading to an improved learning environment within the higher education sector of the Free State Province, South Africa, through the utilization of Bloemfontein campus of the institution of higher learning in the Free State. The primary objective was to create a comprehensive analysis that not only reflects the current state of H&S in educational institutions but also stimulates the development and advancement of strong, enduring, and relevant H&S systems within the country's higher education sector.

7. Importance of the study

Besides economic reasons, the necessity for continuous improvement in H&S compliance in buildings is vital. The subject of H&S in existing buildings spans a wide range of issues; therefore, determining the strategies to be employed to enhance H&S compliance and strengthen OHS practices may be useful. The Bill of Rights set out in the Constitution of the Republic of South Africa, 1996 (Republic of South Africa, 1996), has rights pertaining to the environment. Section 24 reads: "Everyone has the right to an environment that is not detrimental to his or her health or well-being;" (Republic of South Africa, 1996). In consideration of the current/recent? pandemic, the workplace is a concern in terms of the risk of becoming a hub for the spread of any virus. Therefore, continuous research on occupational H&S is necessary to improve OHS performance, both during the COVID-19 pandemic and in the post-COVID-19 era (Okeke-Uzodike, 2021).

In view of the foregoing, the study's findings are expected to benefit employees, students, the public, and the Department of Higher Education and Training (DHET) by identifying intervention measures to enhance H&S compliance in buildings and emergency preparedness.

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In addition, the study is also expected to enhance H&S compliance in HEI buildings with the goal of ensuring that both students and staff benefit, bearing in mind that in a safe environment, meaningful teaching, and learning processes take place there.

This study has the potential to evaluate the H&S conditions of buildings at HEIs in South Africa. This can be done by identifying the hazards in these structures, evaluating the effectiveness of existing control measures in ensuring compliance with OHS practices, and finding ways of improving the OHS organization. The study is also important in that it has the potential of providing ways of improving the awareness of H&S among students, faculty, and other organizational employees through specific H&S management programs. The study also has the potential to unravel the roles of HEIs, employees, and students in ensuring compliance and awareness in H&S issues. Such a revelation may help designate a particular role to a set of people, an individual, or a unit, and hold them accountable for any hazard. The question behind all the remains: Do buildings at HEIs in South Africa provide a safe and healthy environment, and how ready are they for an emergency response?

8. Chapter Summary

In Chapter 1, an overview was presented by introducing the background and context in which the problem was situated, specifically, H&S conditions in HEIs in South Africa, with a focus on an institution in the Free State province. The chapter presented the essential challenges to improving health and safety, including deteriorating infrastructure and the need to enhance safety management in university buildings. The problem statement, research aim, objectives, and research questions were presented to define the purpose and direction of the research. The chapter presented the delimitations, limitations, significance, and ethical principles in the research investigation to define the scope and integrity of the research process. The chapter was concluded by presenting the structure of the remaining chapters.

This chapter laid the foundation for the research by stressing the importance of evaluating H&S in institutional buildings. This chapter also emphasized the need to examine compliance with legislative frameworks and perceptions of health and safety. The next chapter, Chapter 2, will expand on the foundation laid by this chapter by conducting a literature review. This will include a combination of theoretical, legislative, and empirical information on H&S in educational institutions, thereby establishing the need for this research.

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CHAPTER 2: LITERATURE REVIEW

2.0. Introduction

This chapter reviews the key literature that underpins this study. The chapter first discusses the basic concepts of occupational health and safety, followed by an analysis of the legislative framework governing occupational H&S in South African educational buildings. The chapter further discusses the nature of higher education institutions, the common hazards encountered in university settings, and the challenges they face, including maintenance, awareness, safety culture, and resource constraints. The chapter concludes with an analysis of the research gaps, including the absence of studies that have integrated user perceptions, expert opinions, and physical observations of the building. These gaps provide the rationale for the mixed-methods approach used in this study and establish the foundation for the methodology presented in Chapter 3 through the constructs and variables.

2.1. Literature Search Strategy

A structured literature search strategy was employed to identify and select relevant sources of information for this study (Creswell, 2014; Hart, 2018). The search focused on peer-reviewed journal articles, academic textbooks, legislation, policy documents, conference proceedings, and postgraduate theses related to occupational H&S, H&S compliance, and building safety within higher education institutions. Electronic searches were conducted using several academic databases, including Google Scholar, ScienceDirect, PubMed, and the Central University of Technology (CUT) Library electronic databases, which provide access to accredited journals such as *Safety Science, Journal of Safety Research*, and the *South African Journal of Higher Education* (Creswell, 2014). The study used the following keywords for the literature search :("occupational health and safety" OR "health and safety conditions" OR "building safety" OR "workplace safety"), and the literature search included literature published between 2015 to 2025

Key search terms included occupational H&S, H&S compliance, HEIs, building safety, safety management systems, risk assessment, and International Organisation for Standardisation (2018). These keywords were used both individually and in combination to refine search results (Hart 2018). The selection of sources was guided by their relevance to the research objectives,

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applicability to higher education environments, and alignment with South African occupational H&S legislation. Priority was given to recent studies published between 2013 and 2024 to ensure that the literature reflected current practices and emerging trends. Legislative documents such as the Occupational Health and Safety Act (Republic of South Africa, 1993) and the National Building Regulations and Building Standards Act (Republic of South Africa, 1977) were included to establish the regulatory framework underpinning the study of South Africa

2.2. The Concept of H&S in Organized Labor

Before any in-depth discussion on H&S issues, some basic information on the intent of the Occupational Health and Safety Act is necessary. Hattingh (2020) states that, in the realm of safety, the first consideration is legislation. Whether in residential buildings or any other industry, there will be a law to guide safety procedures. According to Machabe and Indermun (2013), the main purpose of the OHS Act 85 of 1993 is to provide a proactive approach to maintaining a safe and healthy working environment. It was defined in 1950 by the Joint Committee of the International Labour Office (ILO) and the World Health Organisation (WHO). Safety relates to the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations. H&S looks at the prevention of illnesses among workers caused by their working conditions. There is also the protection of workers in their employment from risk factors adverse to health. Lastly, H&S concerns the position and maintenance of workers in an environment that is appropriate to their physiological and psychological state (Hattingh, 2020). Recent research suggests that OHS should be viewed as a dynamic and systemic concept rather than a static legal principle. In a complex environment such as a HEI, H&S is influenced by infrastructure conditions, organizational culture, leadership commitment, and user behaviour. Research findings show that institutions with strong safety leadership and integrated maintenance systems show higher levels of compliance and reduced incident rates (Adusei, 2023; Loosemore et al. 2019). This conceptual shift in H&S is particularly important in a university environment where infrastructure conditions are out-dated, and occupancy rates are high.

2.2.1 Duties of the employer

According to Machabe and Indermun (2013), Section 8 of the Occupational Health and Safety Act, 85 of 1993, sets out the fundamental obligations of employers to provide a safe working environment. The Act requires that every employer provide and maintain, as far as is

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reasonably practicable, a working environment that is safe and free from risks to the health of employees. This includes providing and maintaining systems of work, machinery, and processes that do not pose any hazard to employees. The employer is also expected to take reasonably practicable steps to eliminate or minimize health risks before resorting to personal protective equipment (PPE). Furthermore, the Act requires that all planning be done in a way that guarantees the safe production, processing, handling, storage, and transportation of articles or substances in a way that does not endanger employees. Finally, the employer is required to provide information, training, and instruction to ensure that employees' H&S are not compromised while at work (Republic of South Africa, 1993).

2.2.2 Duties of employees

According to the Occupational Health and Safety Act (No. 85 of 1993), as provided by Machabe and Indermun (2013), it is not only the employer's responsibility to ensure a safe working environment, but also that of employees. In this regard, Section 14 of the Act states that "every employee shall take reasonable care for his or her own safety, and for the safety of other persons who may be affected by his or her acts or omissions." In addition, employees are expected to assist their employer in fulfilling the provisions of the Act. This includes abiding by any legally issued instructions, adhering to any H&S rules and procedures in place, and complying with any instructions issued by authorized persons. The Act also requires employees to report any unsafe or unhealthy circumstances to their employer or their representative in H&S as soon as reasonably possible. Furthermore, it requires employees to report any incident which puts their health in danger or causes injury, thus aiding in the recording of incidents.

In view of the above, OHS remains vital to all industries, businesses, and commerce, including traditional industries, information technology companies, the National Health Service, care homes, schools, universities, leisure facilities, and offices (Hughes and Ferrett, 2011). Moreover, H&S should be a joint responsibility between the company, management, and employees. Stakeholders should possess the skills to identify and describe the relationships between the work environment, organisation, productivity, and health (Machabe and Indermun, 2013).

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2.2.3 General overview of health and safety compliance

According to Machabe and Indermun (2013), the South African laws aim to provide for the H&S of persons at work, and for the H&S of persons in connection with the use of plant and machinery, and the protection of persons other than persons at work against hazards of H&S arising out of or in connection with the activities of persons at work. In addition, the laws relate to the establishment of an advisory council for occupational H&S and to provide for related matters. Given the above-mentioned aims, compliance with OHS legislation is important for any organization or business. It is hoped that this study will result in employees, students, clients, and visitors being protected from harm, and lead to the HEIs having greater productivity and more commitment in the workplace. Therefore, continuous comprehensive hazard andrisk assessment of H&S compliance in HEIs' existing buildings, including risk identification, analysis, evaluation, and treatment, is necessary to improve the implementation of OHS practices.

2.2.4 Concept and evolution of H&S compliance

Amongst other efforts to improve H&S, OHS management systems (OHSMSs) have been increasingly adopted by organisations since the late 1980s (Karanikas et al. 2021). Mohammadfam et al. (2017) also asserted that the successful implementation of an OHSMS is perceived as a major priority for organisations. The operation of an OHSMS is identified as the cornerstone to an effective OHS risk management approach.

In 2013, the ISO agreed to pursue a global standard for OHSMSs, and a project committee representing 70 countries undertook its development (Rostykus and Dustin, 2016). ISO 45001 was released five years later in 2018 to set a minimum global standard on protecting employees. The OHS is a set of activities to prevent injuries and health problems to workers, and to provide H&S workplaces (Morgado et al. 2019). According to the International Labour Organization (2021), more than 2.3 million people lose their lives each year in their professional activities, while more than 300 million work-related accidents occur. The impact on companies is significant and most of these accidents could have been avoided. Thus, H&S at work must be addressed in a systematic and integrated way. In view of the importance of international standards, the ISO has established a project committee with a team of experts in

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OHS with the aim of developing an International Standard, ISO 45001, OHSMS requirements, which was published in 2018 (Morgado et al. 2019).

The aim of the OHSMS is to prevent injuries and health issues arising from work activities among the workers, thus providing a safe working environment. It therefore becomes imperative for companies to eliminate and minimize OHS risks through effective prevention and protection. Thus, it is essential to have measures of OHS operations that may have an impact on legal requirements, operational controls, risks, opportunities, and OHS performance, thus ensuring their progress towards the defined objectives (Marhavilas et al. 2018).

Notably, all ISO standards related to management are based on the Deming's or PDCA cycle (Plan - Do - Check - Act), usually referred to as the continuous improvement cycle (Alvarez-Santos, Miguel-Davila, Herrera and Nieto, 2018). The ISO set up a project committee consisting of a team of specialists in OHS to develop an ISO 45001:2018 standard, which is based on OHS management systems (Marhavilas et al. 2018) which was published in 2018. This international standard has adopted a common high-level structure for all ISO Management System Standards (MSSs) (Fonseca, 2015). These standards have identical core texts, terms, and definitions to ensure compatibility and foster easier implementation and integration of ISO MSSs with the management systems of organisations, first implemented with ISO 9001:2015 (Fonseca, 2015). According to the ISO (2018), this model provides an interactive process used by companies to achieve continuous improvement.

Overall, the new standard suggested a more proactive process to identify hazards and risks through foresight. Notably, the OSH remains an important resource for companies in their ambition to be competitive and to produce high-quality products at low cost, in a safe, convenient way, without harming role players and employees. Companies must create a healthy workplace framework that helps guide companies in implementing a healthy workplace environment (Morgado et al. 2019).

2.2.5 Current state of health and safety compliance

It is necessary to build a risk evaluation system for the high-quality development of higher education, drawing on the ISO (2018) and OHS management system tools (Li et al. 2022). A

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university is known as a place that has fewer hazards; however, understanding the practice of OHS among university workers cannot be overemphasised (Stirrat and Jury, 2017). It has been reported that various campus safety incidents do occur frequently (De la Hoz-Torres et al. 2022). For example, the COVID-19 pandemic drastically changed safety measures in every industry, including at HEIs (Du Plessis et al. 2022). The closure of universities and schools during the COVID-19 pandemic was evidence enough of H&S compliance in every South African HEI still being a challenge.

In recent years, the campus safety situation is not optimistic. Campus H&S risks seriously threaten the healthy growth/development? of students. Campus safety has therefore received close attention of the government, society, and schools. At present, the research on campus safety at home and abroad mainly focuses on the current situation of university safety management and risk control of university safety management (De la Hoz-Torres et al. 2022)

Although there are few studies on the health risk of campuses, there is a lack of relevant research on the combination of campus safety and risk management. Even when studies were conducted on health risk on campus, the evaluation method system usually contained information distortion. Importantly, the ISO (2018) emphasizes that organizations must address H&S risks not only from hazardous sources, as was the main focus before the standard's update, but also from the organization's internal and external environment. The ISO (2018) includes considering factors such as the impact of events such as COVID-19 on university campuses in 2020, as well as the needs and expectations of staff and interested parties such as parents and internship enterprises. Additionally, the ISO (2018) involves evaluating performance, such as assessments conducted by universities for H&S, managing changes such as the introduction of new teachers and students, and overseeing outsourcing arrangements such as those involving canteen food suppliers and property management (Bao et al. 2022).

Therefore, there is currently no generally accepted system of H&S management currently. To finally explore the application of technology and an evaluation method system that can give practical guidance to the high-quality development of higher education in universities, more innovative research or more detailed improvement work may be needed (De la Hoz-Torres et al. 2022). The overall aim of this study was to evaluate compliance with H&S standards in the

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buildings of selected institution of higher learning and to make recommendations for improvement. Despite the existence of occupational H&S management systems, such as the ISO (2018), empirical evidence suggests that HEIs continue to struggle with translating policy into practice. This is particularly evident in institutions where facilities management functions operate independently from H&S units. The literature therefore highlights a need for institution-specific assessments that examine actual building conditions alongside user perceptions and management practices.

2.2.6 Nature of higher learning institutions in South africa

The learning environment in HEIs is generally different from that in primary or secondary education. Every HEI is built to provide tertiary education to students through the programmes it offers. Therefore, the design and facilities provided in HEIs must align with the objectives of the education programmes (Amaratunga and Baldry, 2000). Moreover, three additional programme areas have grown exponentially and are therefore considered separately when defining an institution's overall programme. These areas are housing, recreation, and student services. Thus, from nearly every institution's perspective, land use planning now encompasses three essential programme areas, namely academic, administrative, and residential issues (Neuman, 2013).

Neuman (2013) further stated that infrastructure has become more than merely a support system for the core programmes. It is a fundamental programme of its own, with detailed planning and facility requirements. It embraces myriad conventional utilities and specialised facilities, ranging from central plants and information technology to centres and parking structures that hold a campus together. Therefore, six programmes, namely academic, administrative, housing, recreation and athletics, student services, and infrastructure, form the general basics of every campus (Neuman, 2013). Lecture halls, laboratories, libraries, sports facilities, water, electricity, furniture, and shops are also important facilities, as identified by Isa and Yusoff (2015).

Previous studies done on occupational H&S in South African HEIs have focused on compliance, policy, and safety management practices. The major findings of the studies done are as follows: Most higher learning institutions have H&S policies; however, there has been a lack of compliance with these policies. The research done has established that old buildings,

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lack of funds for maintenance, and management fragmentation are major causes of H&S problems in universities.

Despite these findings, limitations in the existing literature can be identified. Firstly, existing literature heavily relies on document analysis and assessment of compliance based on self-reported measures. Secondly, there is a lack of consideration of the physical conditions of the building and infrastructural facilities. Thirdly, very few studies have adopted a holistic approach to evaluate H&S conditions based on perceptions, professional judgments, and on-site observations. There is also a lack of institution-specific studies examining H&S implementation within specific provincial contexts.

2.3. National Building Regulations and Building Standards Act no. 103 of 1977

Seeking to understand the complex array of rules governing H&S in buildings in South Africa, especially those for HEIs, offers a glimpse into the inherent complexity and limitations within these structures. The array of rules related to the H&S of those people within buildings, as clearly outlined in the Constitution of the Republic of South Africa (1977) (as modified), is designed to promote a healthy environment for those within these structures. A number of criteria related to lighting and ventilation, fire prevention, housekeeping and cleanliness, PPE, and first aid are designed to promote a conducive work environment. This legislation has specified minimum requirements for lighting and ventilation to maintain the health and productivity of individuals. This further emphasizes the requirement of sufficient natural lighting and ventilation. The study undertaken by Boubekri (2008) has established a vital relationship between natural light, human performance, and well-being. This indicates that it is not only important to follow lighting and ventilation legislation, but it is also imperative for maintaining individual health.

SANS 10400-P and SANS 10400-S are important standards for evaluating health and safety conditions in university buildings and other higher education facilities. SANS 10400-P, which addresses drainage, requires buildings to have effective systems for the collection and safe disposal of wastewater, soil water, and stormwater, as well as sufficient sanitary facilities based on the building's occupancy (Neethling et al. 2023). In university buildings, compliance with Part P helps prevent blocked drains, sewage overflows, unpleasant odors, water

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contamination, dampness, and the spread of disease in lecture rooms, offices, laboratories, residences, and ablution facilities. SANS 10400-S, on the other hand, focuses on facilities for persons with disabilities and requires university buildings to provide safe and equitable access through suitable entrances, accessible routes, ramps, doorways, parking spaces, lifts, toilets, signage and emergency escape arrangements (Karusseit and Gibberd, 2009). Compliance with Part S therefore reduces the risks of falls, restricted movement, exclusion, and difficulties during emergencies, while ensuring that students, staff, and visitors with disabilities can safely access and use institutional facilities. Collectively, Parts P and S promote healthy sanitation, inclusive access and safe movement within higher education buildings; however, they should be assessed together with other relevant provisions, particularly SANS 10400-O on lighting and ventilation and SANS 10400-T on fire protection.

It is, however, important to note that the Act's provisions regarding fire protection in buildings are intended to protect individuals and property. Based on the significance of this factor, it becomes essential to address issues such as accessibility, fire alarm systems, emergency evacuation, as well as fire resistance. The significance of this factor is evident, especially within learning institutions, where there is an urgent need to safeguard a number of individuals efficiently. Maintaining cleanliness and hygiene, along with first aid and PPE, further underscores the need for a secure, sanitary, and prompt environment in building settings. The importance of maintaining cleanliness and hygiene goes beyond a reactive approach to H&S, as it serves as a health strategy that emphasizes their role in improving H&S (Mbuligwe, 2002). The use of PPE and first-aid resources can meet immediate H&S needs (Dunnett & Arocena, 2010). This provision also has the potential to prevent the progression of events into more severe hazards to overall well-being (Dunnett and Arocena, 2010).

2.4. Key components of health and safety that enhance compliance in higher-learning buildings

H&S compliance in higher education learning buildings is critical, especially when supported by a well-structured (HSMS) and institutional leadership commitment (Mtikitiki et al. 2025). Universities that integrate safety into the governance structures demonstrate higher H&S compliance because they are enforced and formalized rather than seen as voluntary. HEIs with strong H&S regulations, policies, responsibilities, and accountabilities are at the forefront of compliance. According to international management standards, leadership commitment to

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H&S will ensure that H&S objectives are integrated into organizational strategy, resourcing, and performance monitoring, thus improving compliance with regulations that comprise ISO 2018. A HSMS will help to clarify roles and responsibilities within a dynamic environment that involves various stakeholders. This will help to remove any ambiguity.

Furthermore, risk assessment and hazard identification provide the technical basis for proactive H&S practices. Buildings in universities consist of laboratories, workshops, residences, offices, and public spaces, each of which provides distinctive hazards that consist of chemical exposure, electrical risks, overcrowding, and slips and falls. Systematic H&S hazard identification enables the institutions to identify unsafe conditions before incidents occur and ensures regulatory compliance as per risk management requirements. Hughes and Ferret (2020) state that organisations conducting regular risk assessment experience enhanced regulatory compliance since safety controls are implemented proactively rather than reactively. Furthermore, training, awareness, and safety culture also play a crucial role in H&S compliance. Even when the infrastructure adheres to the technical standards, non-compliance frequently arises from behavioural factors, which consist of unsafe practices, ignorance, and risk-taking attitudes. Cooper (2015) mentions that continuous safety education, which consists of inductions, signage, emergency drills, and student orientation, enhances shared understanding of responsibilities and enhances voluntary adherence to rules and regulations. In HEIs, the transient student population makes awareness programmes particularly critical, as compliance depends not only on staff competence but also on occupant behaviour (Guldenmund, 2010).

Another critical factor to consider is the maintenance and inspection of building systems. This factor is closely linked to the operational condition of fire detection systems, ventilation, emergency lighting, building structure, and accessibility. The preventive maintenance process ensures that building safety systems are functioning correctly and in compliance with legislative building regulations. Furthermore, regular inspection ensures that safety standards are met under building regulations. Poorly maintained educational facilities have been linked to increased accidents and legislative non-compliance, as safety features tend to deteriorate over time without regular maintenance. Finally, there are monitoring, reporting, and improvement processes that support long-term compliance. Reporting systems, audits, and

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safety performance indicators allow educational institutions to monitor the effectiveness of policies.

2.5. Occupational Hazards In Higher Education Buildings

Higher education buildings expose end users to various hazards arising from their diverse functions, including teaching, administration, laboratory work, and residences. The most prominent risks include physical hazards such as slips, trips, and falls, as well as poor lighting and excessive noise. Moreover, from a mechanical point of view, potential hazards can arise from moving equipment and lifts, while electrical hazards can stem from exposed wires and overloaded sockets, which can lead to shock and fire. In addition, chemical and biological hazards are more common in laboratories, clinics, and sanitation units where workers are more likely to be exposed to chemicals, chemical fumes, moulds, and biological agents. Ergonomic hazards are more common in offices and computer laboratories owing to prolonged sitting and repetitive tasks. Furthermore, fire and environmental hazards are caused by blocked fire exits, flammable materials, and poor indoor air quality, particularly in older buildings. In addition, psychosocial hazards such as stress and hostility can affect both staff and students in HEIs, which can impact health, safety, and compliance in HEIs. Table 2.1 provides further details on potential hazards in institutions of higher learning:

Table 2:1: Hazards in higher education buildings (Source: Researcher)

Hazard Category	**Specific Hazard**	**Typical Location in HEI Buildings**	**Possible Causes**	**Potential Impact on Occupants**	**Authors**
Physical Hazards	Slips, trips, and falls	Corridors, staircases, entrances, wet floors	Poor housekeeping, leaks, uneven flooring, loose cables	Fractures, sprains, head injuries	Kodur et al. (2020), Spellman, (2023)
Physical Hazards	Falling objects	Libraries, storage	Overloaded shelves,	Head injuries, bruises	Kodur et al.

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		rooms, workshops	unsecured equipment		(2020), Spurlock, (2017)
Physical Hazards	Poor lighting	Parking areas, stairwells, lecture rooms	Burnt bulbs, inadequate design	Eye strain, accidents	Kodur et al. (2020), Stave, and Wald, (2016)
Physical Hazards	Noise exposure	Engineering workshops, plant rooms	Machinery, HVAC systems	Hearing loss, fatigue	Kodur et al. (2020), Onyeaka, et al. (2023)
Mechanical Hazards	Moving machinery	Engineering laboratories	Unguarded machines	Cuts, amputations	Kodur et al. (2020), Ságová, (2025)
Electrical Hazards	Electric shock	Computer laboratories, offices, workshops	Exposed wiring, overloaded sockets	Burns, electrocution	Kodur et al. (2020), Gordon, and Martinez (2018)
Electrical Hazards	Electrical fires	Laboratories, residences	Short circuits, poor installations	Fire injuries	Kodur et al. (2020), Kulor, et al. (2024)

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Chemical Hazards	Chemical exposure	Science laboratories	Spills, improper storage	Skin irritation, poisoning	Kodur et al. (2020), Bhusnure, et al. (2018)
Biological Hazards	Mould and pathogens	Toilets, basements, clinics	Poor sanitation, dampness	Respiratory infections	Kodur et al. (2020), Descatha, et al. (2023)
Ergonomic Hazards	Poor posture	Offices, computer laboratories	Non-adjustable furniture	Musculoskeletal disorders	Kodur et al. (2020), Debrah, and Baah (2024)
Fire Hazards	Blocked exits	Lecture halls, residences	Poor management	Delayed evacuation	Kodur et al. (2020), Zhang, (2023)
Environmental Hazards	Poor indoor air quality	Classrooms, residences	Inadequate ventilation	Headaches, fatigue	Kodur et al. (2020), Smith, et al. (2023)
Psychosocial Hazards	Stress and aggression	Academic departments, student areas	Workload pressure, conflict	Burnout, trauma	Kodur et al. (2020),

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					Quinlan, (2025)

2.6. Factors influencing compliance and non-compliance with health and safety standards in higher education buildings

Table 2.2 shows that compliance with H&S regulations in higher education buildings is affected by organisational, behavioural, and resource factors. First, the strength of management commitment, supervision, communication, training, and the provision of safety resources all impact compliance with regulations by promoting awareness, accountability, and prevention. In contrast, a poor safety culture, poor maintenance, lack of risk assessment, and poor reporting all contribute to repeated risks and hazardous conditions. Human factors, which include negative attitudes, poor competencies, and high workloads, all contribute to non-compliance by promoting violations, while poor regulatory enforcement and poor regulations contribute to non-compliance by reducing institutional accountability. Compliance is therefore a product of the interplay between leadership support, worker behaviours, and institutional structures, while non-compliance is a product of poor coordination and implementation.

Table 2.2: Factors influencing compliance and non-compliance with health and safety standards in higher education buildings (Source: researcher)

Factor (Description & Citation)	**How it Promotes Compliance**	**How it Leads to Non-Compliance**
Management commitment — Visible leadership support improves safety behaviour (Neal & Griffin, 2006)	Allocates resources, enforces policies, prioritises safety	Safety seen as low priority; rules ignored
Safety training and awareness — Knowledge	Workers understand hazards and procedures	Unsafe acts due to ignorance

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improves safe practices (Burke et al. 2011)		
Safety culture — Shared safety values influence behaviour (Cooper, 2000)	Peer accountability and proactive reporting	Normalisation of unsafe practices
Communication — Clear information reduces risk (Reason, 1997)	Hazard reporting and prevention	Misinterpretation of procedures
Supervision — Monitoring improves adherence (Hofmann & Morgeson, 1999)	Immediate correction of unsafe acts	Lack of enforcement
Availability of resources — Adequate equipment supports safety (ILO, 2001)	PPE and maintenance available	Improvisation and shortcuts
Regulatory enforcement — Inspections improve compliance (Gunningham, 2007)	Adherence to legal standards	Minimal compliance
Workload and time pressure — High pressure increases violations (Clarke, 2006)	Safe planning	Cutting corners
Competence and experience — Skilled workers perform safer	Correct hazard handling	Errors due to inexperience

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tasks (Choudhry & Fang, 2008)		
Maintenance management — Maintenance prevents hazards (HSE, 2013)	Safe facilities	Deterioration of buildings
Risk assessment practices — Identification reduces accidents (ISO 45001, 2018)	Preventive control measures	Hazards unidentified
Incident reporting system — Learning prevents recurrence (Reason, 1997)	Continuous improvement	Repeated accidents
Organisational policies — Procedures guide behaviour (OHS Act, 1993)	Structured compliance framework	Ambiguous responsibilities
Safety participation — Employee involvement improves ownership (Neal & Griffin, 2006)	Active reporting	Passive behaviour
Attitudes and behaviour — Perception influences compliance (Ajzen, 1991)	Positive attitudes	Risk-taking behaviour

2.7. Current Safety Conditions and Challenges of H&S In HEI

The emergency and escalation of the COVID-19 pandemic in the first half of 2020 have affected all aspects of human life and all human activities globally. Academic, social, sporting, recreational, physical, religious/spiritual, and economic domains were closely monitored and

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regulated in an attempt to find effective ways to address the challenge. The closure of all HEIs in South Africa and the suspension of the academic calendar were attempts to promote the recovery and continuation of the academic programme. This was done to address the challenge in the country. This move was received with mixed feelings, which led to discussions and debates on the preparedness of South African HEIs to respond to the disruptive effects of COVID-19 and the conditions in these institutions (Naidoo & Cartwright, 2022). There are many flammable, explosive, toxic, or radioactive substances used in laboratories for teaching and research purposes that can potentially cause accidents (Harris, 2015). An unexpected event in a facility caused by various unstable factors that can temporarily or permanently stop the operations is referred to as a safety incident (Bai et al. 2022). In addition to that, Bai et al (2022) discussed challenges and future directions for university laboratory safety.

According to Wu et al. (2007), the laboratory in a college or university plays a critical role in normal classroom teaching and academic research, carrying out the mission of training talent and exploring unknown science. However, during laboratory experiments, faculty members and students are exposed to machines, processes, and chemicals that pose inherent hazards of high temperature, high pressure, flammability, and toxicity (Ayi and Hon, 2018). The presence of these hazards in the laboratory poses a significant risk that could lead to a catastrophic accident. The occurrence of laboratory accidents can be attributed to a lack of knowledge about certain hazards, failure in hazard identification and prevention, and failure in adhering to the procedures. With the increased laboratory accidents and awareness in college and university settings, laboratory safety has become a critical issue (Bao et al. 2022).

Typical university laboratory accidents have caused injuries and fatalities among students and faculty members, damage to costly equipment and structures, and loss of valuable scientific data. In comparison to process safety accidents in industrial settings, laboratory accidents tend to have minor consequences. However, it is noteworthy that the number of laboratories, the number of persons directly exposed to the hazard, and insufficient oversight of safety management add up to considerable risk in university laboratories (Bao et al. 2022).

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2.8. Challenges of health and safety in HEI

The existing literature points to several critical issues that affect the implementation of H&S compliance within HEIs. For one, the existing safety management practices are wanting, while the overall safety culture of the institution may be underdeveloped. This is because institutions are yet to prioritize the implementation of preventive systems effectively. Additionally, there are issues of poor hazard identification and risk assessment practices, which have resulted in the failure of institutions to address risks effectively at an early stage. This, in turn, affects the implementation of control measures. These problems are further complicated by the fact that institutions are yet to effectively establish accident reporting and analysis systems. This has limited the institutions' ability to learn from their mistakes. The fact that there are non-standardised or outdated safety procedures within the laboratories of the institutions further adds to the risks, considering that there are associated chemical, mechanical, and experimental hazards.

In addition to this, infrastructural decline also forms a significant obstacle to compliance. This is because most public universities in the country have ageing infrastructures that need to be maintained to ensure compliance with legislative and regulatory requirements. As Loosemore et al. (2019) point out, deteriorating building services such as electrical wiring, fire alarms, ventilation, and emergency exits all pose significant hazards that can lead to non-compliance with safety standards. All these factors, therefore, indicate that there are significant obstacles to the development of safety management systems in HEIs.

In spite of the existence of legislation on occupational H&S and institutional policies on the same, challenges in the achievement of H&S compliance in HEIs persist. One of the challenges identified in the literature is the physical infrastructure in place in these institutions, especially in public universities. Most of the physical structures in these universities are old and in dire need of maintenance to ensure compliance with safety standards (Loosemore et al. 2019). This refers to deteriorating building services such as electrical installations.

Another challenge that may be encountered by HEIs regarding the implementation of H&S management systems is related to financial constraints. This may act as a barrier to the implementation of H&S management systems within HEIs. This is mainly because financial

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constraints may lead to delayed maintenance of buildings, which may result in a reactive rather than a preventive approach to H&S management. This may be a barrier to the implementation of H&S management systems within all buildings within HEIs.

One of the key challenges that may be encountered by HEIs regarding the implementation of H&S management systems involves the condition of the physical facilities. This is mainly because studies have shown that the condition of the physical facilities may have an impact on the overall quality of the learning environment. Previous research has highlighted that there are various challenges related to the condition of the physical facilities within HEIs, especially in countries where the maintenance of such facilities may be limited.

Besides infrastructural challenges, OHS management in HEIs can also be influenced by organisational and managerial factors. Effective OHS management in any organisation requires the active participation and commitment of all parties involved. Besides infrastructural challenges and financial constraints, organisational and human factors are also to blame for H&S shortcomings in HEIs. Research findings show that OHS management in HEIs can be impaired by unclear roles and responsibilities among different parties involved in H&S management as well as a lack of accountability among individuals (Agostinelli, 2009).
In addition to this, inadequate training and low levels of H&S awareness among staff and students contribute to H&S shortcomings in HEIs (ILO, 2021). These challenges demonstrate that effective H&S management in HEIs requires not only compliance with legislation but also sufficient resources, coordinated management structures, continuous training, and proactive monitoring of building conditions.

2.9. Future directions for health and safety improvement

The literature has identified various strategic directions for enhancing H&S management within HEIs (Moyo, 2022). These include applying the concept of inherent safety, developing effective methods for hazard and risk assessment, establishing effective laboratory safety management systems, developing accident databases within HEIs to facilitate learning, and enhancing a safety culture within university environments. These strategic directions emphasize the need to continually improve existing safety management systems globally. Despite numerous occupational H&S laws, only a handful of studies have examined these issues in HEIs, and even fewer have offered guidance on improving safety management in

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university environments. This shows that the current study is relevant to the field because it will provide guidance on aligning HEIs with national laws on occupational H&S.

While the literature has documented a myriad of occupational hazards in the university environment, the common problem is the lack of uniformity in implementing the safety management system. In the African and South African context, research has shown a lack of uniformity in the implementation of building regulations, particularly in older buildings, which are common in academic and student residential facilities where safety risks are higher (Moyo, 2022; Adusei, 2023). The problem therefore is not the lack of legislation, but the lack of monitoring, maintenance, and accountability (Moyo, 2022).

2.9.1. Current compliance strategies in institutions of higher learning

According to the findings of De la Hoz-Torres et al. (2022), universities are prone to risks such as poor management of emergency plans, low rates of safety training, infrequent fire drill sessions, and inconsistencies during fire drills. These risks may include fire outbreaks and chemical leaks. Therefore, the improvement direction for addressing occupational health and safety risks at the university should include the development of an achievable emergency plan. Universities' department of safety management should come up with a contingency plan to help it cope with unexpected occurrences. The staff and students should be mobilized to carry out various activities such as emergency drills. Timely safety risk training should be conducted. Professionals should be invited to conduct systematic training on safety regulations, identification, assessment, and control of hazard sources, as well as identification, assessment, and control of risk sources for staff and students at HEIs, who can be trained and rehearsed in conjunction with the established emergency plan. The researcher/It is believed that the current compliance strategies in HEIs are not functional and need to be enhanced.

Research Gaps Identified in Literature Although extensive literature exists on occupational H&S legislation and management systems, limited empirical studies have focused on the practical implementation of these systems within university buildings in South Africa. Existing studies mainly focus on compliance rather than actual conditions. Additionally, there is a lack of integrated studies that incorporate inspection results, perceptions, and professional opinions to comprehensively evaluate H&S compliance. This study aims to bridge the existing

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gap by evaluating H&S conditions in university buildings using a mixed-methods research design comprising questionnaires, interviews, and building inspections.

Theoretical framework

The study was guided by the framework of the International Organization for Standardization, with specific focus on the International Organization for Standardization and the Plan-Do-Check-Act cycle (ISO, 2018). The framework (as depicted in Figure 2.1 below) is a systematic process for identifying hazards, evaluating risks, controlling hazards, monitoring performance, and improving performance (Republic of South Africa, 1993). The PDCA cycle was considered because it is consistent with the objectives of this study in that it advocates for continuous improvement and proactive management of risks. This model has provided guidelines on how compliance is conceptually viewed, measured, and enhanced in the higher learning institutions, especially in matters of H&S.

Under the first phase, which is the planning phase, there is an evaluation of the baseline conditions and the risk elements in order to identify the expected standard and areas of enhancement. The second phase, which is the implementation phase, provides a spectrum of the existing practices and control strategies in the implementation phase. The evaluation stage is also in line with the analytical assessment, whereby quantitative and qualitative datasets are examined in order to identify the level of conformity and performance of safety practices in the institutions of higher learning. The final phase provides guidelines on how recommendations and strategies can be enhanced in order to strengthen compliance.



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Figure 2-1: PDCA model (Source: Huan and Nasri, 2022)

From a holistic perspective in the context of HEIs, this model facilitates the evaluation of H&S policies, practices, and systems across different building types (Morgado et al. 2019). This model was followed in designing the research tools for data collection, including questionnaires, interviews, and a building inspection checklist to ensure that key aspects of H&S systems are not overlooked, such as hazard identification, compliance, and effectiveness (Karanikas et al. 2021). By employing this model, it was possible to evaluate H&S conditions in an institution of higher learning.

2.10. Summary

This chapter has provided a comprehensive review of literature related to OHS in HEIs. The review has discussed H&S as a fundamental concept; the legislative framework that guides H&S practices with particular reference to South Africa; the nature of HEIs; the H&S challenges related to academic buildings, laboratories, residences, and other facilities; the status of H&S compliance; occupational hazards; factors influencing effective or ineffective implementation of OHS management systems; existing compliance strategies; and management systems, including their effectiveness and their limitations. Through this review, gaps in the literature were identified, particularly the limited empirical research focusing on actual building conditions, user experiences, and integrated assessment approaches within South African universities. These identified gaps established the need for the present study and informed its focus and design. Building on the literature reviewed in this chapter, the next chapter outlines the research methodology adopted for the study, including the research design, study population, sampling procedures, data collection instruments, and data analysis methods used to assess H&S conditions within the selected HEI.

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CHAPTER 3: RESEARCH METHODOLOGY

3.0 Introduction

This chapter describes the research methodology adopted to achieve the study's aim and objectives, which sought to assess the H&S conditions within the buildings of a higher education institution in the Free State province. The chapter outlines the literature review strategy, research design, approach, study setting, population, sampling procedures, data collection methods, and data analysis techniques.

3.1 Research Design

This study employed an exploratory sequential mixed-methods design. This approach integrated qualitative interviews with quantitative questionnaires, thereby facilitating a comprehensive understanding of H&S dynamics within the higher learning institution. Initially, professionals in the field were consulted to identify key practices and areas of focus. Following this, the second phase of the study, which included a questionnaire survey, was conducted to evaluate the existing H&S conditions across various university settings.

The initial phase of the study involved conducting interviews with H&S professionals to gather insights into the necessary H&S requirements within university buildings. Subsequently, questionnaires were administered to assess the current H&S conditions prevailing in the university buildings. This research technique enabled a comprehensive examination of H&S issues by incorporating input from both specialists and end users to develop effective strategies and procedures. Furthermore, the checklist was used to assess the buildings in the institutions.

3.2 Research Area

The study was conducted at a university located in Bloemfontein, within the Mangaung Metropolitan Municipality in the Free State province of South Africa. The Mangaung Metropolitan Municipality includes the urban areas of Bloemfontein, Botshabelo, and Thaba Nchu and serves as an important administrative, educational, and economic center within the province.

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The selected university campus is situated within the urban area of Bloemfontein. As a HEI, the campus comprises academic buildings, administrative facilities, student residences, laboratories, and support infrastructure that are used daily by students, staff, and visitors. These characteristics make the institution a suitable site for assessing occupational H&S conditions within HEIs. Figure 3.1 presents the study site's location within the Mangaung Metropolitan Municipality, indicating Bloemfontein and the university where the study was conducted.

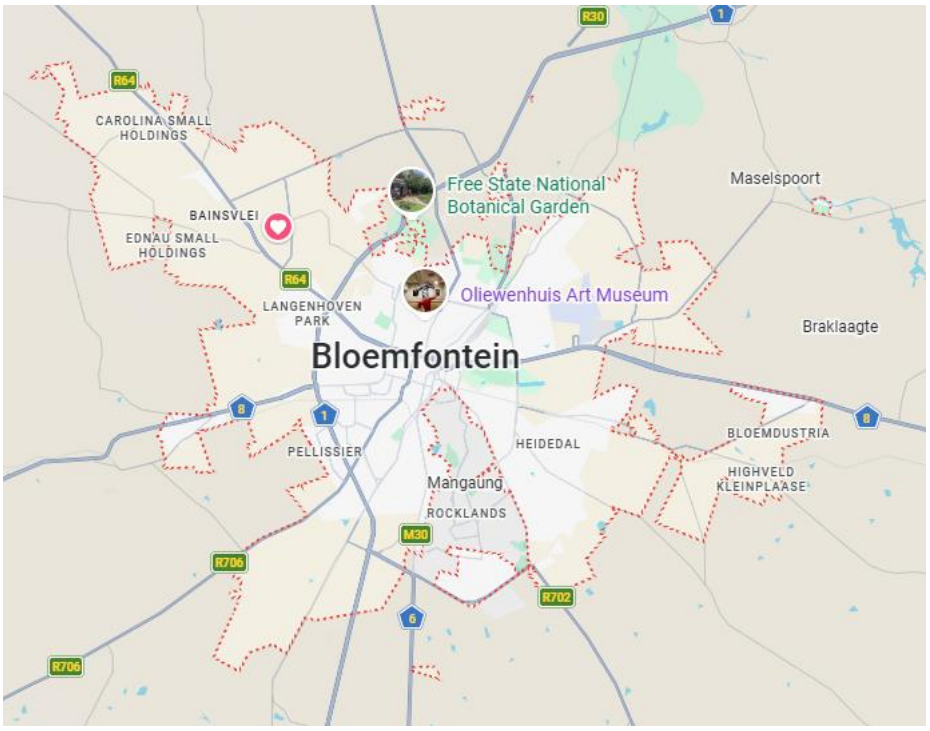


Figure 3-1: Geographical map of Mangaung Metropolitan Municipality showing the location of Bloemfontein and the study site (Source: Google Maps)

3.3 Study Population

3.3.1 Sample sizes

Sample size refers to the number of observations, units, or participants included in the study. It was a critical element of the research design as it influenced the reliability and validity of the results. A sufficiently large sample size yielded more accurate estimates of population parameters and increased the study's ability to detect significant effects. Conversely, a small sample size could have led to less reliable findings, greater variability, and a higher likelihood of errors. This study comprised four independent population groups: students, staff, H&S professionals, and buildings (lecture blocks and residential buildings).

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3.3.2 Students Sample Size

According to the institution student portal in Bloemfontein campus, the university's total student population was approximately 21,578 across both the Bloemfontein and Welkom campuses, with around 15,906 students enrolled at the Bloemfontein campus. From the student's part, 372 of them responded to the questionnaire. Since the study focused on the Bloemfontein campus, the sample was drawn from this population. Of these 15,906 students, 1,367 were postgraduate students (part-time and full-time) who did not use campus facilities daily, while approximately 3,000 were only enrolled in specific modules to complete their studies. This left approximately 11,539 students who occupied the campus infrastructure on a full-time basis. The study's sample size was calculated for this group of full-time students. Figure 3.2 displays the result of the sample size calculation, which determined that a sample of 372 was necessary for the survey.

This calculation assumed a confidence level of 95%, a margin of error of 5%, a population proportion of 50%, and a total population size of 11,539. A 95% confidence level indicates a 95% probability that the survey results fall within ±5% of the true population value. The population proportion was set at 50%, a conservative estimate when no prior information about the population distribution was available. The large population size of 11,539 slightly increased the required sample size compared to smaller populations; however,500 questionnaires were dispatched, and only 372 surveys were returned and were sufficient to achieve the desired precision and confidence. This calculation was critical in ensuring that the study results were statistically reliable and applicable to the broader population within the specified parameters.

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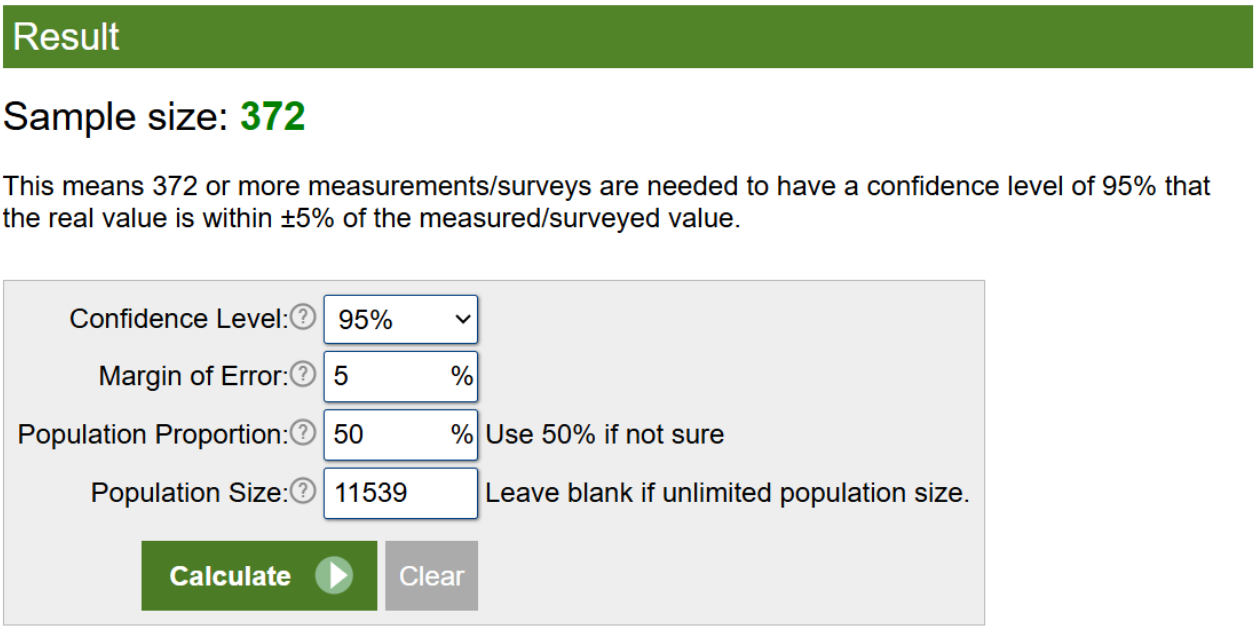


Figure 3-2: Students' sample size calculations

3.3.3 Staff sample size

The total staff population at the university was approximately 1,100 at the time of the study. Of this number, around 500 were employees who did not regularly use the university facilities; therefore, they were not relevant to the study, since they couldn't provide a reflection on the health and safety issues in the prospective buildings. Furthermore, these cohorts included the staff members, part-time lecturers, and externally based personnel. This implied that approximately 600 employees regularly occupied the campus facilities. The sample size for the study was calculated based on these 600 employees, as shown in Figure 3.3 below. Figure 3.3 illustrates the calculation of a staff sample size of 235 for the survey. Lectures and the support staff from the following divisions were included in the study: Engineering, Built Environment and Information Technology, Estate and Infrastructure, Faculty of Engineering, Built Environment and Information Technology, Faculty of Health, Faculty of Management Science, Finance

Financial Operations, Governance, Risk and Compliance, HR, Health and Environmental Science, Humanitas, Institutional Advancement, Management Science, Recourses and Operations, Risk Division, Service Staff, and Sports Division

This calculation was based on specific parameters: a confidence level of 95%, a margin of error of 5%, a population proportion of 50%, and a total population size of 600. The result

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indicated that at least 109 completed surveys or measurements were required to achieve a 95% confidence level, meaning there was a 95% probability that the survey results would fall within ±5% of the true population value. The population proportion was set at 50%, a standard assumption when there is no prior knowledge of the true population proportion, as it maximises the required sample size for a given confidence level and margin of error. The 5% margin of error suggested that the estimates derived from the sample were expected to fall within five (5) percentage points of the true population value, given the chosen confidence level.

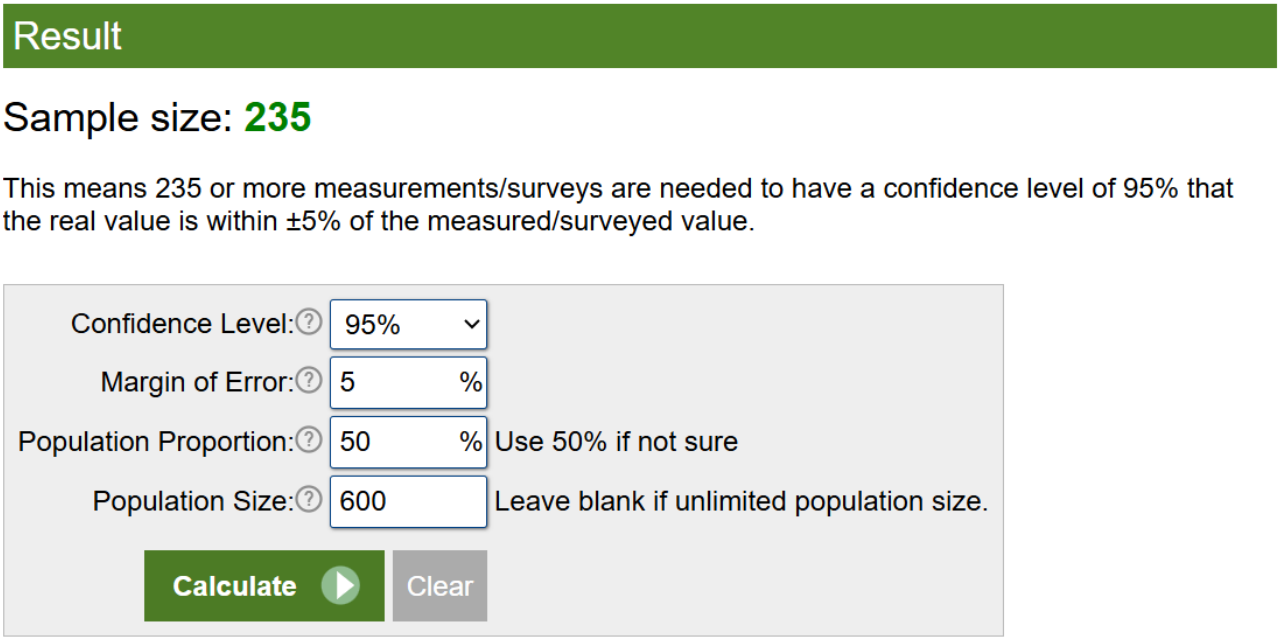


Figure 3-3: Staff sample size calculation

3.3.4 Health and safety professionals' sample size

In addition, between four and six H&S professionals permanently employed at the University were interviewed to provide expert insights into H&S practices. Lectures and the support staff from the following were included in the study: Engineering, Built Environment and Information Technology, Estate and Infrastructure, Faculty of Engineering, Built Environment and Information Technology, Faculty of Health, Faculty of Management Science, Financial Operations, Governance, Risk and Compliance, HR, Health and Environmental Science, Humanitas, Institutional Advancement, Management Science, Recourses and Operations, Risk Division, Service Staff, and Sports Division. Their contributions ensured a comprehensive understanding of H&S management within Free State.

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These professionals offered valuable perspectives on the implementation of institutional policies, operational challenges, and compliance mechanisms related to occupational H&S within the university environment.

3.3.5 Buildings Sample Size

Selected buildings at the university were included in the study, as illustrated in Table 3.1. Including all buildings enabled a thorough assessment of the physical conditions, safety measures, and compliance with relevant H&S standards across both academic and residential structures on campus. High-risk buildings were considered within each faculty based on their occupancy levels, intensity of use, and the nature of activities conducted. However, laboratories within the Faculty of Health and Environmental Sciences were intentionally excluded from the study. The exclusion of laboratories is justified because these facilities are governed by specialized health, biosafety, chemical safety, and laboratory-specific regulations that differ substantially from the general building health and safety requirements assessed in this study. Laboratories are subject to additional statutory requirements relating to hazardous chemical storage, biological agents, ventilation systems, waste management, and specialized emergency response procedures. Including these facilities would have introduced unique risk variables that would have required a separate assessment framework and specialized evaluation criteria, thereby compromising the comparability of findings across the other university buildings. The study therefore focused on general academic, administrative, residential, and support buildings, where health and safety requirements are relatively comparable under the Occupational Health and Safety Act (Act No. 85 of 1993), the National Building Regulations (SANS 10400), and institutional health and safety policies. This approach ensured methodological consistency and allowed meaningful comparison of health and safety conditions across the selected university facilities.

Table 3.1: Buildings included in the health and safety compliance inspection

Building Name	Type/Purpose	Justification
Engineering Building	Academic/Workshops & Laboratories	High-risk areas due to heavy machinery, laboratories, and high student and staff occupancy.

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Library	Academic/Study Space	High foot traffic and occupancy require stringent safety measures.
Residences	Accommodation/Student Housing	Vital for assessing safety and health conditions in student living environments.
Science Block	Academic/Laboratories	Involves hazardous materials and chemicals, making it a high-priority safety compliance issue.
Cafeteria	Public/Food Services	High daily foot traffic and potential food safety concerns.
Health and Wellness Centre	Public/Health Services	Critical for ensuring compliance with health-related safety standards.

3.3.6 Inclusion criteria

The study examined structures located on the university's premises in the Free State, and these were mostly the buildings that the students were normally using day to day. The decision to select university as the data collection site was based on the researcher's thorough knowledge of the institution, its ethical standards, and its regulatory framework. Being familiar with the subject matter enabled the researcher to develop a comprehensive and legally sound ethical application, thereby enhancing the likelihood of prompt approval. Furthermore, while still enrolled as a student at the institution, the researcher collected data at the university, and the university was used since it had a wide variety of buildings.

The target population for the study was selected in accordance with the safety framework and organisational structure of university. Participants included individuals from diverse roles within the institution, such as students, academic staff, administrative staff, facility managers, and security personnel. Characteristics considered for inclusion in the study included individuals who regularly interacted with the buildings being evaluated, possessed firsthand knowledge of safety protocols and procedures, and could provide insights into the day-to-day operations and H&S challenges within the institution's premises. Additionally, participants were selected to represent a cross-section of demographic backgrounds, disciplines, and levels

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of experience, ensuring a comprehensive understanding of H&S practices across the university.

3.3.7 Exclusion criteria

Exclusion criteria for participants in the study involved individuals who did not directly interact with the buildings being evaluated. These individuals included administrative staff members whose work primarily took place off-campus or in administrative offices and who did not directly use the buildings for operational purposes. This also encompassed part-time staff members, such as lecturers, who did not frequently utilise the campus facilities. Additionally, H&S professionals who lacked sufficient understanding of the institution's H&S protocols or were unable to provide meaningful insights into the condition of the buildings were excluded. These exclusion criteria were established to ensure that the participants selected for the study were capable of providing valuable insights and contributing meaningfully to the assessment of H&S conditions within the selected HEI in the Free State province of South Africa. Although other institutions in the Free State possessed similar facilities, they were excluded from the study owing to differing ethical application requirements, which could have hindered data collection within their facilities.

3.3.8 Sampling Method

According to Sharma (2017), sampling is a method used by researchers to select a smaller number of representative items or individuals systematically from a predetermined population to be used as data sources for observation or experimentation in accordance with the study's objectives. The adequacy of a sample is evaluated based on the extent to which it accurately reflects the entire population from which it was drawn (Kitchenham and Pfleeger, 2002). Sampling techniques are categorised into two main types: probability sampling and non-probability sampling. The current study adopted a non-probability sampling method owing to the nature of the research. Non-probability sampling is a technique in which samples are selected based on subjective judgment rather than random selection (Sharma, 2017). Unlike probability sampling, where every member of the population has a known and equal chance of being selected, non-probability sampling does not involve random selection (Sharma, 2017). This means that some members of the population have no chance of being included,

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while others could be disproportionately represented. Non-probability sampling techniques include purposive sampling, quota sampling, snowball sampling, and self-selection sampling.

In purposive sampling, researchers use their judgment to select participants who are most representative or useful for the research (Alvi, 2016). This method is employed to focus on specific characteristics within the population relevant to the study's objectives. The advantage of purposive sampling is that it allows for the selection of particularly informative or relevant cases (Alvi, 2016). However, it is subject to researcher bias and might not be representative of the broader population. Quota sampling involves dividing the population into mutually exclusive subgroups and selecting samples from each subgroup according to predetermined quotas (Sharma, 2017). Nevertheless, the selection within each quota is not random. The advantage of this method was that it ensures the representation of specific subgroups within the sample, although non-random selection within quotas could introduce bias and limit the generalisability of the results.

In addition, snowball sampling is another approach where existing study participants recruited future participants from among their acquaintances (Sharma, 2017). This method is particularly useful in studies involving hidden or hard-to-reach populations. The primary advantage of snowball sampling is its effectiveness in accessing difficult-to-reach groups; however, it carries the risk of bias since it relies on the social networks of the initial participants. Lastly, self-selection sampling occurs when participants voluntarily choose to take part in a study, often in response to an open call for volunteers (Sharma, 2017). This method is easy to implement and cost-effective but carries a high risk of self-selection bias, which could limit the sample's representativeness.

For the interviews in the current study, purposive sampling was used to ensure that individuals with in-depth knowledge and experience in H&S were included. This approach enabled the collection of detailed perspectives and a deeper understanding of H&S practices within HEIs. Additionally, the online questionnaire utilised a snowball sampling approach to ensure broad distribution to students across the campus. For the assessment of the buildings, a structured H&S audit checklist was employed. Purposive sampling was also adopted for this phase, with the entire target population included, ensuring that all selected buildings within the university were assessed.

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3.4 Pilot Study

According to Creswell (2014), a survey's questions and results should cover as many aspects of the subject matter as possible. Furthermore, validity, as defined by Whiston (2016), involves collecting data that is appropriate for the intended purpose of the measuring instruments. Before the main study, a pilot study was conducted to assess the validity and reliability of the research instruments used to evaluate the H&S conditions of the selected buildings at the university. The pilot study involved three students, three H&S consultants, and three staff members, all randomly selected within the institution, to test the research instruments. These participants were asked to provide feedback on the clarity, relevance, and comprehensiveness of the survey questions. The data collected from the pilot study were excluded from the main study.

During the pilot study, participants were guided through the questionnaire and encouraged to provide comments or suggestions for improvement. The focus was on identifying any ambiguities or areas where the questions could be misinterpreted. Additionally, participants were asked to evaluate the time required to complete the questionnaire to ensure its practicality for use in the main study. Furthermore, one building was selected for the pilot study to assess its H&S conditions. The findings from the pilot study informed revisions to the questionnaire, ensuring its validity and reliability before full-scale implementation in the main study. By conducting a pilot study with students, staff members, and H&S consultants, the research refined the survey instrument, thereby enhancing the quality, accuracy, and reliability of the data collected during the main study.

3.5 Data Collection Instruments

3.5.1 Primary data collection

Phase 1 -The use of interviews

To ensure comprehensive data collection, semi-structured interviews were conducted primarily via online platforms, such as Zoom, and in person, depending on participants' preferences. Prior participant approval was obtained before recording the interviews. H&S

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professionals employed at the university provided invaluable insights into H&S procedures, compliance, and attitudes within HEIs in the Free State.

The purpose of the interviews with H&S professionals was to gather comprehensive insights into H&S procedures, compliance, and attitudes within university buildings. The interviews aimed to assess whether the institution's buildings met H&S standards. Additionally, they served to explore the expertise of H&S professionals, their perspectives on current practices, and their recommendations for improvement. The interviews provided rich qualitative data that contributed to evaluating H&S practices and enhancing standards within the institution.

Participants were informed that audio recordings would be used during the interviews, and specific consent was obtained for these recordings. All recordings were securely stored on password-protected devices and encrypted cloud storage, accessible only to the research team. Personal information was anonymized, while the data were reported in aggregated form to ensure confidentiality. Recordings and associated data were retained only for the duration of the study and securely deleted upon completion, unless participants agreed otherwise for publication purposes.

Interviews were used as a qualitative data collection tool to obtain in-depth information relevant to the study's objectives. The interview method allowed the researcher to explore participants' experiences, perceptions, and insights regarding H&S conditions within the selected university buildings. This approach was considered appropriate because it provided opportunities for clarification, probing, and follow-up questions, thereby enabling the collection of rich, detailed data.

A semi-structured interview guide was used to ensure consistency across interviews while allowing flexibility for participants to elaborate on issues they considered important. The interview questions were aligned with the research objectives and focused on key aspects of H&S compliance, challenges, and existing practices within the institution. The interview guide used during data collection is provided in Appendix E.

Phase 2 -The use of questionnaires

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The questionnaires (Appendices F1 and F2) were designed for end users, such as students and staff members at the university, and distributed face-to-face. This distribution method aimed to target and engage the intended respondents effectively, ensuring the collection of accurate, relevant data. The purpose of using questionnaires in this study was to gather comprehensive data regarding the H&S conditions inside the buildings of the university. The variables in the questionnaires were derived from the literature and were aligned with the research objectives outlined in the study.

Phase 3 – Building inspections using a checklist

This checklist was specifically designed to evaluate various H&S parameters within educational facilities. By using this audit tool, the study systematically examined elements such as fire safety measures, structural integrity, air quality, and hazardous-material management in campus buildings. The detailed data collected through the Environmental, Health, and Safety (EHS) Audit Checklist (Appendix G) enabled the researcher to assess compliance with existing H&S regulations and to identify potential risks and areas of non-compliance. The outcomes of this assessment were crucial in formulating recommendations to improve H&S standards, thereby ensuring a safer learning environment for students and staff at the Free State's HEIs. Phase 3 of the study was completed over approximately one month.

3.5.2 Secondary data

To develop a theoretical understanding of the topic, a comprehensive literature review of relevant sources, as recommended by Creswell (2014), was conducted. These sources included books, academic journals, conference papers, and dissertations. Access to most research materials was facilitated through the university library and its associated electronic databases. The analysis of the research data was benchmarked against secondary data to determine the level of agreement or divergence between the study's findings and the existing literature. This comparison enabled the validation of the findings using secondary data and ensured that the research objectives were effectively addressed.

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3.6 Recruitment and Consent Process of Participants

For the semi-structured interviews (Phase 1), potential participants were identified based on their roles as H&S professionals at the university. They were selected based on their involvement and expertise in the institution's H&S procedures. Participants were contacted via email, where the study was introduced, its purpose outlined, and comprehensive details about the interview process were provided prior to the interviews taking place. Follow-up emails were sent to confirm their willingness to participate and to address any questions they had. The participants' preferred interview format (online or in-person) was determined during this exchange. Consent was obtained prior to recording the interviews to ensure that all ethical considerations were met.

For the questionnaires, employees and students were recruited through convenience sampling to ensure accessibility and inclusion of a diverse group. The questionnaires were distributed face-to-face across various locations on the university campus, such as lecture halls, staff rooms, libraries, and common areas, to engage a broad range of participants. Efforts were made to target different departments, faculties, and levels of study or employment to ensure representation and diversity in the responses. Before distributing the questionnaires, participants were briefed on the study's purpose, voluntary participation, confidentiality, and their right to withdraw at any time. Written consent forms (Appendix

J) and information sheets (Appendix C) outlining the study's purpose, procedures, and data protection measures were provided to inform participants about the study. The researcher's contact information was also shared for any follow-up questions or concerns.

3.6.1 Language and translation considerations

The study was conducted at the Bloemfontein campus of the institution of higher learning in the Free State, where most of the population is Sesotho-speaking. Sesotho is also the researcher's home language. This facilitated effective communication with the participants. For minority-language speakers who required assistance, a trained assistant was assigned to provide translation support. The assistant adhered to the Protection of Personal Information (POPI) Act to ensure confidentiality and protection of personal information. This approach

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ensured inclusivity, allowing participants from diverse language backgrounds to contribute meaningfully while maintaining the study's integrity and ethical standards.

3.7 Data Analysis

Firstly, data from the interviews were analysed using thematic analysis. The data from the recordings were uploaded into ATLAS.ti software and then thematically analysed. Thematic analysis is a widely used qualitative method for analysing interview data, focusing on identifying, analysing, and reporting patterns or themes within the data (Leedy and Ormrod, 2014). The process began with familiarisation, during which the researcher read through the interview transcripts thoroughly to gain a comprehensive understanding of the content. Next, initial codes were generated by labelling key aspects of the data relevant to the research questions. These codes were subsequently grouped into themes based on shared ideas or concepts. These themes were then reviewed and refined to ensure they accurately represented the data, with adjustments being made as necessary. Once finalised, the themes were defined and named, providing a clear structure for the analysis. The final stage involved writing up the analysis, where illustrative examples from the data were used to explain each theme, effectively linking the findings to the broader research context.

Secondly, quantitative data from the questionnaires were captured electronically in Microsoft Excel. Further statistical analysis was performed by a statistician using SAS Version 9.4. Descriptive statistics, namely frequencies and percentages, were calculated for categorical data, while means and standard deviations, or medians and percentiles, were calculated for numerical data. The Shapiro–Wilk test for normality was used to determine whether the numerical data followed a normal distribution. Analytical statistics, specifically the chi-square test or Fisher's exact test, were employed to compare proportions between groups. Additionally, the T-test or ANOVA was used to compare mean values between groups, while the Mann–Whitney U-test or Kruskal–Wallis test was applied to compare median values between groups. A significance level (α) of 0.05 was used in this study.

Lastly, the data obtained from the EHS Audit Checklist were analysed in the same manner as the quantitative data derived from the questionnaires. This ensured consistency and reliability in the interpretation of results across all data collection instruments.

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3.8 Reliability and Validity of the Study's Data

According to Creswell (2014), research is considered legitimate when the researcher follows specific steps to guarantee the reliability of the results. Furthermore, reliability is defined as the consistency and repeatability of results when the same procedures are applied (Harper et al. 2016). The actions listed below were taken to ensure both validity and dependability throughout the study. Additionally, ATLAS.ti's capacity to integrate qualitative and quantitative methods strengthened the validity of the research findings (Silver and Lewins, 2014).

3.8.1 Reliability and validity of qualitative data

Utilising a range of qualitative and/or quantitative approaches is referred to as methodological triangulation. When the results from each approach are consistent, validity is established (Guion et al. 2011). All interviews were recorded after the interviewees had granted consent, as recommended by Carter (2013). This was essential to provide a permanent record of what was said and to serve as more trustworthy evidence. For qualitative data obtained from interviews, triangulation was used to verify the reliability and validity of the results. Triangulation involved using multiple sources, methods, theories, or investigators to cross-check and corroborate findings. This approach enhanced the data's credibility by confirming that the findings were consistent across contexts and perspectives.

3.9 Reliability and Validity of quantitative data

According to Cresswell (2014), a survey's questions and results must encompass various aspects of the subject matter. Moreover, validity, as defined by Whiston (2016), involves collecting data that align with the intended purpose of the measuring instruments. In this study, participants were asked to share their insights regarding H&S practices, including their knowledge, attitudes, and compliance behaviours, within the context of the study.

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3.10 Approval of the Study

3.10.1 Ethical Considerations

All phases of the research process addressed ethical considerations (De Vaus, 2013). The ethical implications of data collection, analysis, and presentation were carefully considered,

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and participants' safety was prioritised throughout the study (Creswell, 2014). No participant experienced harm. Participation was voluntary, and no individual was coerced (Creswell, 2014). Participants were fully informed about the purpose and procedures of the study and provided informed consent, including the right to withdraw at any stage without negative consequences. Ethical clearance was obtained from the Health Science Research Ethics Committee of the University of the Free State (Appendix J), and institutional permission (Appendix J) was secured before data collection. Confidentiality and anonymity were strictly maintained (Fleming and Zegwaard, 2018). No identifying information was disclosed, and all data were used solely for academic purposes. Data were securely stored, with electronic files being password-protected while hard copies were kept in a secure location. The study was conducted with honesty, integrity, and respect for participants

3.10.2 Project safety

Project safety was paramount; measures were put in place to ensure participants were not exposed to any risks. This included safeguarding participants' physical and emotional well-being throughout the research process. Any potential risks or discomforts associated with participation were carefully considered and mitigated to maintain the highest ethical and safety standards during the study.

3.10.3 Confidentiality and privacy

Confidentiality and the privacy of participants were maintained by ensuring that all data collected were kept confidential and anonymised. Participants' identities were protected, and only aggregate data were reported in any publications or presentations resulting from the study. All electronic data were stored securely, with access restricted to authorised personnel only, thereby upholding the principles of confidentiality and data protection throughout the research process.

3.10.4 Compliance with the POPI Act

The research complied with the Protection of Personal Information (POPI) Act by ensuring that all personal information collected from participants was handled in accordance with the Act's principles. This included obtaining informed consent from participants, informing them of the purpose of data collection, and ensuring that their personal information was not disclosed to any unauthorised parties. Participants were informed that audio and/or video recordings would be used during the interviews, with specific consent being obtained for these

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recordings. All recordings were securely stored on password-protected devices and encrypted cloud storage, accessible only to the research team. Personal information was anonymised, and data were reported in aggregated form to maintain confidentiality. Recordings and data were retained only for the duration of the study and securely deleted upon completion, unless participants agreed otherwise for publication purposes.

3.11 Summary

This chapter presented the methodological framework guiding the study. It described the research design and approach selected to address the research objectives, providing justification for the chosen methodology. The chapter further outlined the study site and provided contextual information on the location where the research was conducted. In addition, the study population and sampling procedures were explained to clarify how participants and buildings included in the study were selected. The chapter also detailed the data collection methods employed, including interviews, questionnaires, and building inspection tools, and highlighted how each method contributed to achieving the study's objectives. The procedures followed during data collection were described to ensure transparency and replicability of the research process.

Furthermore, the chapter explained the data analysis techniques applied to both qualitative and quantitative data, outlining how the collected data were organised and analysed. Ethical considerations observed throughout the research process were also discussed, including informed consent, confidentiality, anonymity, and secure data handling. These measures were implemented to ensure that the study was conducted responsibly and in accordance with accepted ethical standards. Building on the methodology described in this chapter, the next chapter presents the analysis and discussion of the data collected during the study. Chapter 4 presents the results from questionnaires, interviews, and building inspections in relation to the research objectives.

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CHAPTER 4: PRESENTATION AND INTERPRETATION OF FINDINGS

4.0. Introduction

This chapter presents the analysis and interpretation of all data collected to assess H&S compliance within the selected institution. The findings draw on three integrated sources of evidence: quantitative survey data collected from staff and students via structured questionnaires; qualitative insights from semi-structured interviews with H&S professionals; and observational data generated through EHS audit checklists used during building inspections.

The datasets were analysed using a combination of statistical techniques such as descriptive statistics as well as thematic analysis to examine interview narratives and physical compliance indicators. Together, the quantitative, qualitative, and observational findings provide a comprehensive understanding of compliance levels, prevailing hazards, user perceptions, infrastructure conditions, and institutional safety practices. The results are presented in alignment with the research questions and objectives, highlighting major patterns, recurring themes, and key relationships that shape the institution's overall H&S performance.

4.1. Quantitative Analysis

4.1.1 Student data

Student demographics

The demographic findings in Table 4.1 revealed that a little over half of the students were undergraduates, while 46.8% were postgraduate students. This clearly indicates that the students at different education levels were represented.

Table 4:1. Student demographic

Variables	Categories	Frequency	%

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Level of study	Postgraduate	174	46.8%
	Undergraduate	198	53.2%

The findings provided in Table 4.2 give an overview of the students' perceptions, awareness, and experience regarding H&S their institution. When students were asked to point out the most important factors that improve adherence to H&S, most (27.2%) indicated clear communication as the most important, followed by the provision of safety equipment (24.7%). The next two factors were training with regularity (21.8) and the provision of signs (19.6), followed by taking punitive measures against non-compliance, which they identified as the least important (6.7%). This shows that the efficacy of students is higher in terms of taking proactive measures to enhance their safety.

In relation to daily exposure, the findings on the frequency of exposure of students to safety and cleanliness measures showed that a majority reported being exposed to safety and cleanliness measures at least once in a while (33.6%), at times (31.2%), or not at all (12.9%). This finding indicates a possible gap in the implementation of safety measures in facilities. On the same note, most students (39.07%) indicated that institutional safety checks were rarely or occasionally carried out (34.4%). Only 10.57% indicated that they were done regularly.

Although 26.1% of the students stated that they were informed about safety issues every quarter and 17.2% every month, a significant number of 40.1% stated that they were never informed about safety concerns. This result demonstrates the urgent lack of safety communication, which might influence the preparedness and awareness of the student body in a negative way. On the issue of training, a quarter of the students (22.0%) responded that they were trained or taught about safety measures, 42.5% failed to respond, and 35.5% responded that they were partially trained. This proves that H&S training among a good number of students is inadequate. The majority of the students (80.4%), however, reported that they had never witnessed or experienced a situation of safety on campus personally, while 19.6% indicated they had.

In the evaluation of perceptions of emergency preparedness, over half of the students (56.7%) said that they were not sure whether emergency preparedness was in place, with 24.5% agreeing that there were emergency preparedness measures in place and 18.0% saying there

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were no measures in place. When asked about safety control measures, only 13.2% reported their availability, while an alarming 86.8% stated they do not exist. On the same note, only 11.0% of students believed that certain safe places existed in campus buildings, with 89.0% stating that there were none. These results indicate significant inadequacies in infrastructure and in students' knowledge of emergency measures and safe areas within the institution.

Student frequency dataset

In terms of emergency measures that are already in place, while 24.5% agreed that there are enough, another 18.0% stated that there are none. Moreover, when asked about the existence of safety control measures, only 13.2% confirmed that there are, while an alarming number of 86.8% stated that there are none. Furthermore, only 11.0% of the students were of the view that there are specific safe places available within the buildings of the institution, while another alarming number of 89.0% stated that there are none (Table 4.2).

Table 4:2. Students' perceptions, awareness, and experience regarding H&S at the institution

Variables	Categories	Frequency	%
Aspect that enhances compliance the most	Available safety equipment	92	24.7%
	Clear communication	101	27.2%
	Measures for compliance	25	6.7%
	Regular training	81	21.8%
	Visible signage	73	19.6%
How often do you come across safety/cleanliness?	Always	92	12.9%
	Never	101	1.6%
	Often	25	20.7%
	Rarely	81	31.2%
	Sometimes	73	33.6%
Institutions that conduct safety checks	Never	19	5.1%
	Not sure	41	11.0%
	Occasionally	128	34.4%
	Rarely	145	39.0%
	Regularly	39	10.5%
How often informed are you about safety issues?	Immediately	62	16.7%
	Monthly	64	17.2%
	Never	149	40.1%

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	Quarterly	97	26.1%
Trained or informed about safety	No	158	42.5%
	Partially	132	35.5%
	Yes	82	22.0%
Ever witnessed/been in an incident?	No	299	80.4%
	Yes	73	19.6%
Enough emergency measures	No	67	18.0%
	Not sure	211	56.7%
	Yes	91	24.5%
	Yes	3	0.8%
Control measures present	No	323	86.8%
	Yes	49	13.2%
Safe places in campus	No	331	89.0%
	Yes	41	11.0%

Table 4.3 presents the Likert-scale variables that provide further information on students' perceptions of safety issues. With the scale representing very low (1) to very high (5), the students rated familiarity with H&S at 3.08 (SD=1.18), their confidence in their knowledge of safety at 3.24 (SD=1.06), the effectiveness of current safety measures at 3.19 (SD=0.90), and overall safety in the institution at 3.10 (SD=1.05). The overall feeling of safety registered a highest mean score of 3.44 (SD=1.00) among the students. These results show that the student perceptions about the safety measures are concentrated around the middle of the scale, which implies a medium level of awareness and confidence; however, there were no significantly positive perceptions of institutional safety performance

The descriptive findings indicate that students consider communication and the visibility of safety measures to be the primary means of compliance; however, a significant discrepancy is noted in institutional policies regarding training, safety inspections, and information sharing. This is due to the low rate of awareness on the part of the students on control measures or safe places, which is of concern regarding the preparedness of the institution in terms of emergencies. Although students' perceptions of the university's H&S were slightly above neutral, the results clearly indicate where the university can improve its H&S procedures, especially in training, communication, and the provision of conspicuous safety infrastructure.

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Table 4.3: Analysis of students' perceptions on safety issues on a Likert scale

Variable	N	Mean	Std Dev	Min	Max	Interpretation
Familiar with H&S	372	3.08	1.18	1	5	Moderate familiarity
Confidence in knowledge	372	3.24	1.06	1	5	Slightly above moderate
Effectiveness of current measures	372	3.19	0.90	1	5	Moderate effectiveness
Rating of the institution safety	372	3.10	1.05	1	5	Neutral to slightly positive.
Overall feeling of safety	372	3.44	1.00	1	5	Above average feeling of safety

4.1.2 Staff dataset

4.1.2.1 Interpretation of descriptive results for staff

Table 4.4 shows the distribution of staff across the institution's faculties, departments, and operational units. The data indicate that a wide range of academic and administrative areas has been utilised to attract respondents, thereby providing broad institutional coverage for the study. The largest percentage of participants was from the Resources and Operations unit (25.11%), followed by Management Science (10.21%), FEBIT (9.79%), and Humanities (8.94%). The remaining faculties and departments showed lower percentages, reflecting the uneven but diversified distribution of employees among the units of the institution.

Table 4.4: Distribution of staff by departments

Faculty/department	Frequency	Percent
Engineering	3	1.28
Engineering, Built Environment and Information Technology	1	0.43
Estate and Infrastructure	8	3.40
Estates and Infrastructure	12	5.11
Estates and Infrastructure	1	0.43
Estates and Infrastructure	1	0.43
Estates and Infrastructure	1	0.43

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FEBIT	23	9.79
Faculty of Engineering, Built Environment and Information Technology	1	0.43
Faculty of Health	3	1.28
Faculty of Management Science	2	0.85
Finance	8	3.40
Financial Operations	1	0.43
Governance, Risk and Compliance	2	0.85
HR	13	5.53
Health and Environmental Science	1	0.43
Health and Environment	1	0.43
Health and Environment Sciences	1	0.43
Health and Environmental Science	4	1.70
Health and Environmental Sciences	14	5.96
Health and Safety Science	1	0.43
Humanitas	2	0.85
Humanities	21	8.94
Institutional Advancement	1	0.43
Management Science	24	10.21
Management Sciences	6	2.55
Management Science	1	0.43
Recourses and Operations	1	0.43
Resources and Operations	1	0.43
Resource and Operation	1	0.43
Resource and Operations	2	0.85
Resources and Operation	1	0.43
Resources and Operations	59	25.11
Resources and operation	1	0.43
Resources and operations	2	0.85
Risk	5	2.13
Risk Division	2	0.85
Service Staff	1	0.43
Sports Division	1	0.43

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Sports Division	1	0.43

4.1.2.2 Descriptive statistics of staff

The descriptive statistics in Table 4.5 provide extensive background information on staff members' perceptions of H&S measures in the institution. Five main variables are examined: familiarity with protocols, perceived safety, confidence, the effectiveness of measures, and the institutional communication rating. All the mean values ranged from 3.0 to 3.2 on a five-point Likert scale. This means that the agreement level of the sample is moderate, and that while staff are accepting of the application of H&S initiatives, they regard them as average and not very positive in terms of adequacy or effectiveness.

Table 4.5: Descriptive statistics for staff perceptions on H&S protocols

Variable	N	Mean	Std. Dev.	Min	Max	Median	Mode	Skewness	Kurtosis
Familiar	235	3.11	0.62	2	5	3	3	1.11	2.62
Safe	235	3.03	0.64	1	5	3	3	-0.03	1.90
Confident	235	3.24	0.59	2	5	3	3	0.77	1.12
Effective	235	3.04	0.58	1	5	3	3	-0.53	2.94
Very effective	235	3.03	0.53	1	4	3	3	-0.48	2.73

4.1.2.3 Staff perceptions of H&S protocols

Figure 4.1 shows the results in relation to staff familiarity with H&S protocols at the university. The results indicate that staff evaluated familiarity with safety measures with an average score of 3.11 (SD = 0.62), ranging from 2 (the lowest) to 5 (the highest), as presented in Table 4.5 and Figure 4.1. This is equivalent to a 4 in the Likert scale, which implies that they have moderate knowledge regarding H&S practices in institutions. Although most of the participants were partly aware of the safety measures, the inconsistent results show that not all employees in the workforce are equally familiar with the safety measures. Moreover, the positive skewness value of 1.11 implies that a large percentage of employees in the workforce

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reported low levels of familiarity with the safety measures, hence moving the curve to the left side of the scale.

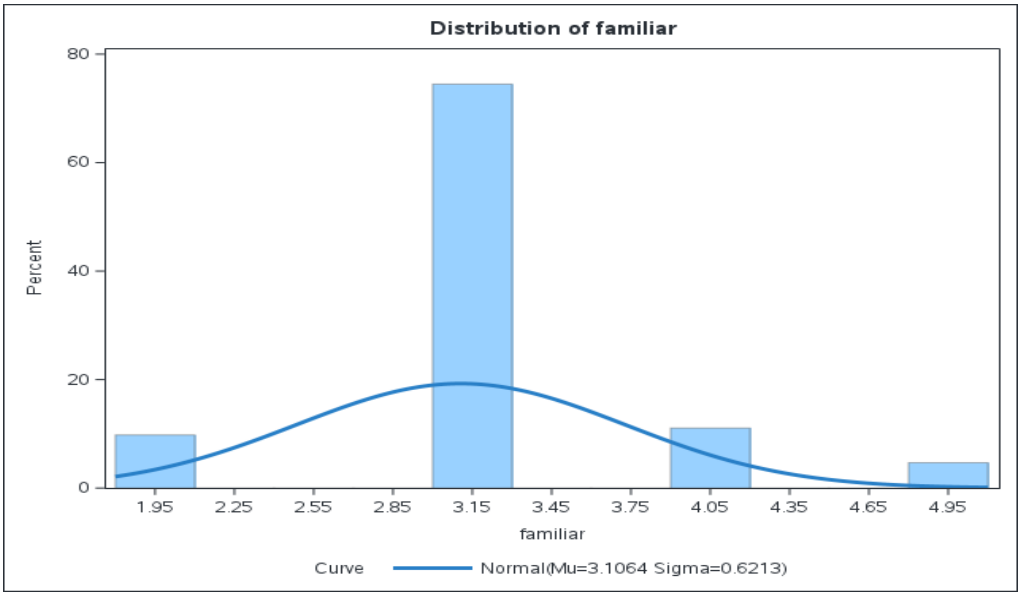


Figure 4-1: Distribution of staff familiarity with H&S protocols

From Figure 4.1, it was clear that the perception of safety within the institutional buildings stood at 3.03. The lowest being 1 and the highest being 5 showed that there were conflicting feelings of safety. Surprisingly, the curve of the results showed that it was almost symmetrical, given that the skewness stood at -0.03. This implied that there were equal opinions of people who felt unsafe and those who felt safe.

4.1.2.4 Staff perception of safety within institutional building

Figure 4.2 indicates that staff perception of the concept of safety and security relating to institutional buildings was rated at 3.03 (SD = 0.64). The minimum is 1 and the maximum is 5; this indicates that there were contradictory perceptions of the concept of safety. It is interesting to note that the distribution is almost perfectly symmetrical (skewness = -0.03), indicating that there is a fair degree of balance between the lower and higher perceptions of safety.

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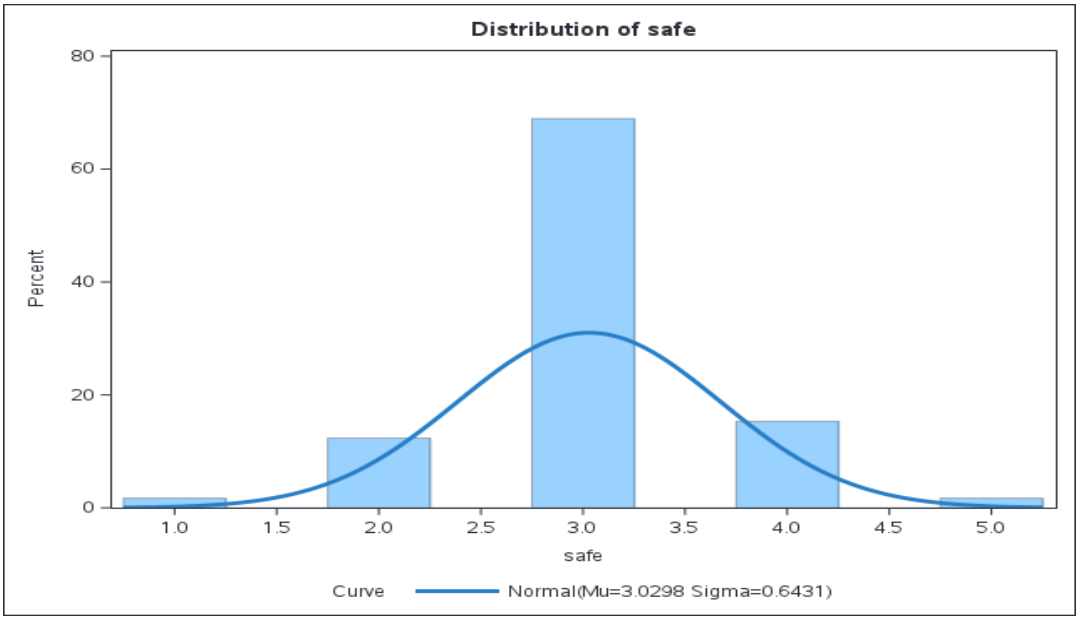


Figure 4-2: Staff perception of safety and security within institutional buildings

4.1.2.5 Staff confidence in their knowledge of safety procedures

The results in relation to staff confidence in their knowledge of safety procedures are shown in Figure 4.3. Staff members evaluated the current safety measures with a mean score of 3.04 and a standard deviation of 0.58. The institutional measures receive some effectiveness assessment from people who believe their current security measures do not provide full protection. On one hand, the staff tended to rate their assessment results slightly above average, based on the negative skewness of -0.53. On the other hand, the assessment results pointed to the practice and implementation areas that needed development.

The institution received a 3.03 rating with a standard deviation of 0.53 for its safety protocol communication. The participants throughout the study showed consistent results, indicating they viewed the communication as sufficient, although it lacked outstanding qualities. Furthermore, the staff members demonstrated consistent perceptions about this aspect, which showed their assessment results, which nevertheless remained centred on the mid-point of the scale

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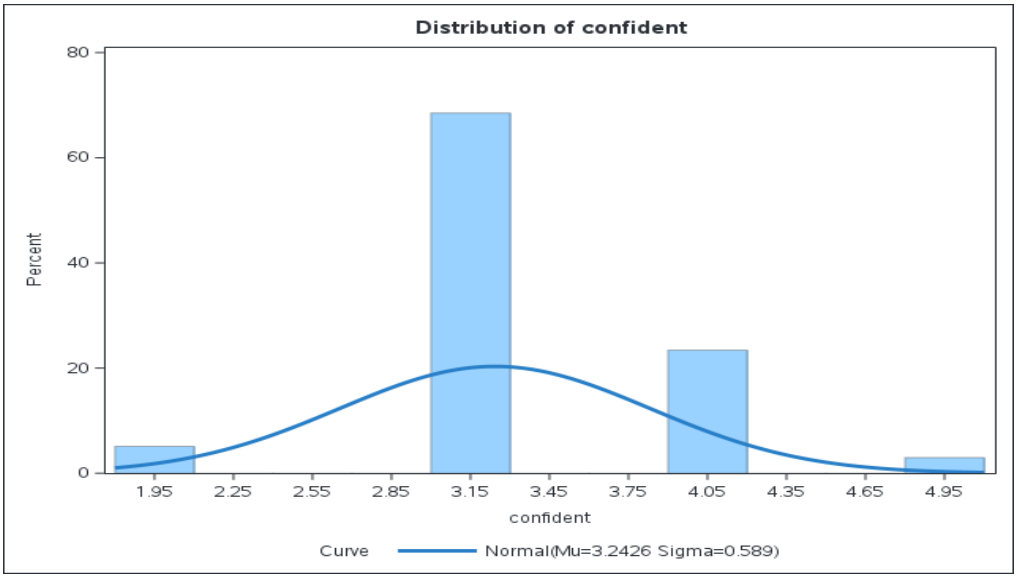


Figure 4-3: Staff confidence in their knowledge of safety procedures

4.1.2.6 Effectiveness of current safety measures

The results depicted in Figure 4.4 show that staff members rated the institution's H&S environment as between average and moderately satisfactory. The aim of this research was to determine what the staff members are unaware of and what they do not trust. Based on the findings, it is clear that organizations need to have training programmes in place to help workers become aware of the organizations' H&S procedures.

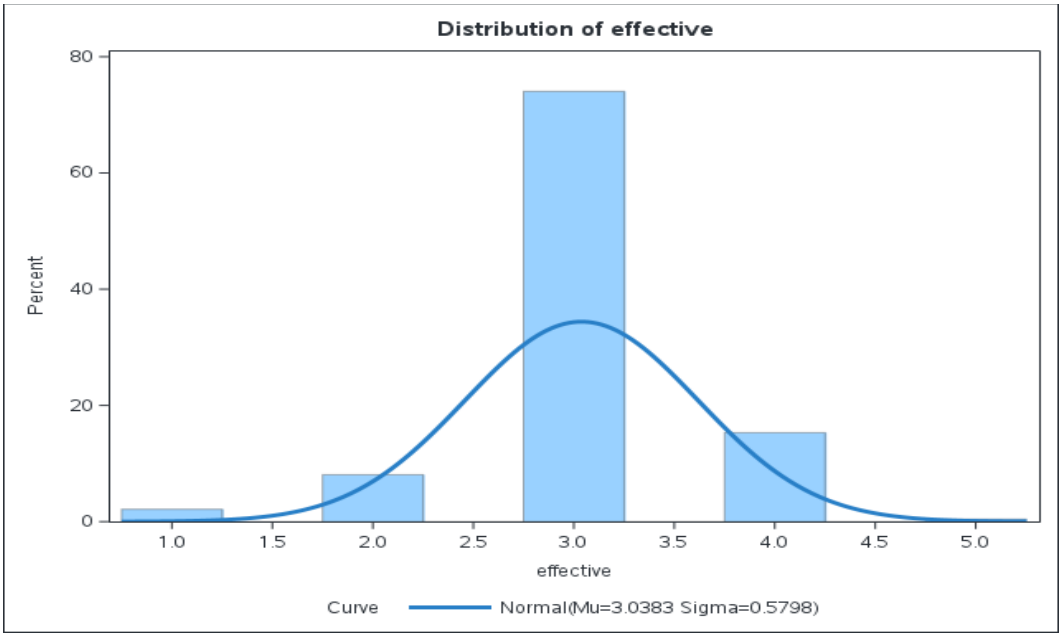


Figure 4-4: Effectiveness of current safety measures

4.1.2.7 Comparison of staff perceptions of H&S issues across faculties

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Table 4.8 presents the analysis of variance (ANOVA) results, indicating that perceptions of H&S conditions differ significantly across faculties within the institution. Quantitatively speaking, the findings indicated that differences in faculty membership accounted for between 25% and 34% of the variance in staff perceptions. All tests were also statistically significant at $p < 0.05$. This confirms that these differences are unlikely to have occurred by chance. Accordingly, these findings indicate that one-quarter to one-third of staff perceptions of H&S issues can be attributed to faculty-level differences. This underscores the importance of faculty-specific contexts in informing staff perceptions in H&S issues.

Table 4.6: ANOVA results for staff perceptions of H&S issues across faculties

Dependent Variable	F (df=39,195)	p-value	R^2	Interpretation
Familiar	1.98	0.0013	0.28	Significant differences by faculty
Safe	2.13	0.0004	0.30	Significant differences by faculty
Confident	1.76	0.0070	0.26	Significant differences by faculty
Effective	2.56	<0.0001	0.34	Significant differences by faculty
Very effective	1.65	0.0143	0.25	Significant differences by faculty

The distribution chart in 4.9 illustrates the level of familiarity with H&S procedures, as rated by the staff in different faculties. The spread of ratings clearly shows the difference in the level of familiarity with H&S procedures in different faculties. The ANOVA statistical results ($F = 1.98$, $p = 0.0013$) confirm the statistical significance of the difference in the level of familiarity with H&S procedures in different faculties at a 5% significance level (Table 4.8). In essence, this shows that some faculties have higher ratings in terms of awareness and knowledge of H&S procedures, while others have lower ratings. The faculties and units with higher ratings include Humanities and Resources and Operations Department, while others, such as Engineering and Health and Environmental Sciences, have a wide spread with generally lower ratings

The safe chart distribution shows how the staff perceived the safety of their working environment in different faculties. Once again, in Table 4.8 the results show a statistically significant difference ($F = 2.13$, $p = 0.0004$), which means that the faculty context is a key

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factor in how safe people feel in the buildings. In some faculties, most people rated their perception of safety at moderate levels, while in others, some people scored either extremely low or extremely high on the scale, indicating they felt either extremely unsafe or extremely safe in their environment. The reason for this is likely to be the inconsistent implementation of safety measures in different divisions.

The Q-Q plots of effective chart examines the normality of responses regarding the perceived effectiveness of institutional safety measures. The data points tend to follow this diagonal line, suggesting that the data is fairly normally distributed with most staff rating the effectiveness around the middle of the scale. However, deviations from this line at both ends can be attributed to staff who rate these measures as very ineffective (rating 1) or very effective (rating 5). The moderate number around the mean suggests that while some measures are deemed to be working fairly well, there is considerable room for improvement in their effectiveness from different faculties' perspectives.

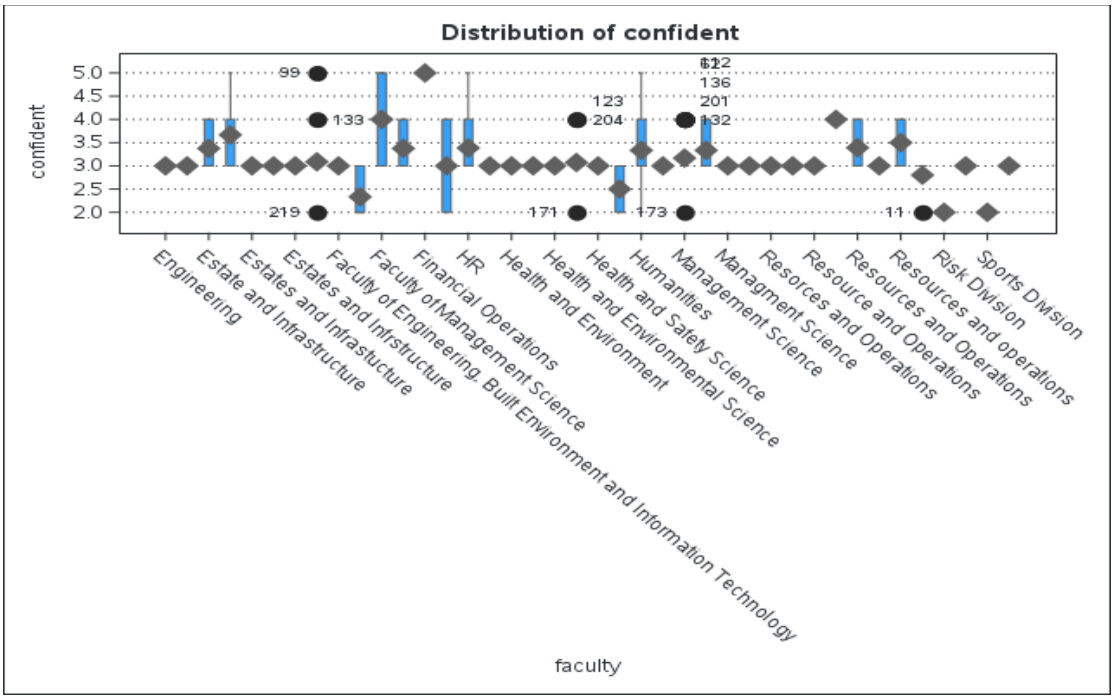


Figure 4-5: Distribution of confidence in knowledge

The results depicted in Figures 4.8 and 4.9 show that there is substantial evidence that the state of H&S within the institution is not consistent across faculties. The critical values obtained using ANOVA show that differences are indeed significant, which means that awareness

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among staff, perceptions of safety, as well as effectiveness, are largely influenced by faculty. This directly relates to the research objective of determining the state of compliance

Table 4.3: Frequency table of compliance by group

Group	Compliance = 0	Compliance = 1	Total
Staff	201	34	235
Student	0	0	0
Total	201	34	235

The frequency analysis in Table 4.8 showed that compliance was recorded only among staff, with 235 usable cases. Among the staff, there were 201 who were classified as non-compliant, while there were 34 classified as compliant. This shows a relatively low level of compliance. The categorical predictors showed a varied range, as in the case of the staff, only 19 were fully trained (1), while the majority were partially trained (163). The same can be said of those who reported having enough control measures, as only 50 reported, followed by only 36 who reported having enough safety resources placed appropriately. Furthermore, only a small number, totalling only 18, reported the presence of working emergency systems. This shows a lack of resources in the aspect of emergency preparedness.

Table 4:4: Frequency of training, control, placement, emergency, and signature

Variable	Category	Frequency	Cumulative
Training (trained_bin)	0 (None)	53	53
	0.5 (Partial)	163	216
	1 (Full)	19	235
Control (control_bin)	0 (No)	185	185
	1 (Yes)	50	235
Placement (places_bin)	0 (No)	199	199
	1 (Yes)	36	235

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Emergency (emergency_bin)	0 (No)	217	217
	1 (Yes)	18	235
Signage (signage_num)	1	14	14
	3	186	200
	4	24	224
	5	2	226

The descriptive statistics (MEANS procedure) confirmed that staff ratings of perceptions such as familiarity, safety, confidence, effectiveness, and institutional commitment to safety all clustered around three (3) on a five-point scale, indicating moderate but not high perceptions. For example, the mean score for "familiar" was 3.11, while "confident" slightly surpassed this at an average of 3.24. Variability was modest (SD ≈ 0.6), suggesting staff generally agreed that safety practices are present but insufficiently strong. In contrast, all student data fields were missing, reinforcing that meaningful compliance analysis could only be carried out among staff.

The correlation analysis in Table 4.11 revealed that the compliance score was significantly but modestly associated with "familiar" ($r = 0.25, p < .001$) and "confident" ($r = 0.15, p = .018$). Other perception measures such as "safe," "effective," "rateinst," and "signage_num" showed no significant linear relationship with compliance. This suggests that knowledge of safety practices and personal confidence may be more directly tied to actual compliance, while perceptions of institutional measures are weaker predictors.

Table 4.5: Descriptive statistics (MEANS procedure) - Staff only

Variable	N	Mean	Std Dev	Min	Max	Missing
Compliance score	235	0.87	0.78	0	4	0
Familiar	235	3.11	0.62	2	5	0
Safe	235	3.03	0.64	1	5	0

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Confident	235	3.24	0.59	2	5	0
Effective	235	3.04	0.58	1	5	0
Rate Institution	235	3.03	0.53	1	4	0
Signage Number	226	3.00	0.63	1	5	9

Table 4.6: Correlation of perceptions with compliance score (Staff)

Variable	R	p-value
Familiar	0.250	0.0001
Safe	0.004	0.957
Confident	0.153	0.019
Effective	-0.036	0.579
Rateinst	-0.088	0.179
Signage_num	0.057	0.394

The multiple regression model in Table 4.12 provided stronger insights in correlation of perceptions with compliance score based on staff perspectives. The model fit was superb with $R^2 = 0.898$ and $Adj.R^2 = 0.893$. This shows that the predictors accounted for nearly 90% of the variance of the compliance score. Of all the predictors, confidence was highly significant at $\beta = 0.099$, $p = .007$. Training, controls, and placement of safety resources were highly significant at $\beta = 1.043$, $p < .001$; $\beta = 1.023$, $p < .001$; $\beta = 0.962$, $p < .001$, respectively. Familiarity, perceived safety, effectiveness, rating of institution, signage, and witnessing an incident were not significant once the stronger predictors were included. This again points to compliance being influenced by practical institutional factors rather than by perceptions.

Table 4.7: Correlation of perceptions with compliance score (Staff)

Variable	**R**	**p-value**
Familiar	0.250	0.0001
Safe	0.004	0.957

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Confident	0.153	0.019
Effective	-0.036	0.579
Rateinst	-0.088	0.179
Signage_num	0.057	0.394

The multiple regression model in Table 4.13 provided stronger insights based on regression. The model fit was superb with $R^2 = 0.898$ and Adj.$R^2 = 0.893$. This shows that the predictors accounted for nearly 90% of the variance of the compliance score. Of all the predictors, confidence was highly significant at $\beta = 0.099$, $p = .007$. Training, controls, and placement of safety resources were highly significant at $\beta = 1.043$, $p < .001$; $\beta = 1.023$, $p < .001$; $\beta = 0.962$, $p < .001$, respectively. Familiarity, perceived safety, effectiveness, rating of institution, signage, and witnessing an incident were not significant once the stronger predictors were included. This again points to compliance being influenced by practical institutional factors rather than by perceptions. The logistic regression using compliance as a binary outcome confirmed these findings.

The model fit improved substantially with covariates (AIC dropped from 171.3 to 69.2). Training, controls, and placements all had very strong effects, with Wald χ^2 tests highly significant. The odds ratios for these predictors were extremely large, showing that the presence of training or safety infrastructure greatly increased the likelihood of compliance. The factor analysis of staff perceptions in Table 4.14 revealed three latent constructs. The first factor loaded strongly on “effective” and “rateinst,” reflecting institutional capacity. The second factor captured “familiar,” “safe,” and “confident,” representing personal awareness and confidence. The third factor was associated mainly with “signage,” reflecting environmental cues. After Varimax rotation, these three factors explained a combined variance of about 2.87, with Factor 1 and Factor 2 contributing the most. These results suggest that compliance attitudes are structured into institutional support, personal awareness, and physical environment.

Table 4:8: Multiple regression (DV: Compliance score, Staff)

Predictor	Estimate	Std. Error	t	p-value

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Intercept	-0.146	0.149	-0.98	0.329
Familiar	0.020	0.036	0.55	0.582
Safe	-0.049	0.037	-1.33	0.186
Confident	0.099	0.036	2.73	0.007 **
Effective	0.058	0.045	1.27	0.207
Rateinst	-0.034	0.050	-0.68	0.498
Signage_num	-0.038	0.028	-1.37	0.172
Witnessed_bin	0.116	0.076	1.52	0.130
Trained_bin	1.043	0.069	15.07	<.0001 ***
Control_bin	1.023	0.049	21.09	<.0001 ***
Places_bin	0.962	0.055	17.58	<.0001 ***

$Model\ fit: R^2 = 0.898, Adj.R^2 = 0.893, F(10,215) = 188.3, p < .0001$

Lastly, the principal components analysis (PCA) verified that the first two components accounted for 65% of the total variance, with the first component being heavily loaded for institutional and perceptual measures (eigenvalue 2.84), whereas the second component differentiated between signage. The logistic regression equations using the PCA-derived predictors had near-perfect classification (concordance = 100%), although problems of separation influenced odds ratios. This nevertheless underscores that compliance can be almost perfectly predicted when combining perception dimensions with institutional variables.

Compliance among staff is low overall but is strongly driven by institutional factors such as training, control systems, and resource allocation. In addition, confidence and familiarity also have a part to play, but perceptions of institutional effectiveness and safety signage were not as strong as predictors. Factor analysis indicates that compliance has multiple aspects, including institutional, personal, and environmental elements. The data for students was not able to be analyzed as it was missing, thus the patterns are unique for staff

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Research Question

RQ1: What are the components of health and safety that contribute to improved compliance within the buildings?

The analysis of compliance levels demonstrated a concerning trend. Out of the 235 total number of staff, only 34 persons, which translates to 14.5%, were identified as compliant with the established safety protocols, while the majority, amounting to 201 persons or 85.5%, were identified as non-compliant, according to Table 4.4. The university has its safety protocols; however, its staff does not comply with them. Compliance with safety protocols is a challenge at the institution. Student compliance creates a gap that prevents researchers from making valid comparisons between student and staff behaviour, with this gap underscoring the need for future programmes that specifically address students whose compliance status remains unknown.

The results show that the institution operates in a system that sustains a culture of low compliance throughout its activities. In this case, staff members who are expected to show examples of safety procedures and enforce organisational rules had very low levels of compliance. This raises more questions about the training and responsibility systems in place. The study found that knowledge of safety practices does not guarantee proper execution because organisations face three main obstacles: insufficient institutional backing, weak enforcement, and limited safety work dedication. The research shows that safety protocols exist primarily as formal policies which need organizations to take specific steps for their personnel to convert safety knowledge into practical implementation.

RQ2: What are the occupational hazards present in the buildings at the institutions of higher learning?

The results show that institutional provisions have a greater impact on compliance than personal perceptions do. The multiple regression analysis showed that training ($\beta = 1.04$, $p < .0001$), control measures ($\beta = 1.02$,$p < .0001$), and placement of safety resources ($\beta = 0.96$,$p < .0001$) served as the strongest and most dependable indicators of compliance among staff members. The three institutional supports together accounted for almost 90% of the compliance score variability. In contrast, staff members who possess safety knowledge must

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follow safety protocols based on institutional protection measures, training programme availability, and safety equipment accessibility.

The student dataset provides evidence which confirms this pattern. Students reported that clear communication (27.2%) and the availability of safety equipment (24.7%) were the most important factors for ensuring compliance, while punitive enforcement was ranked least important (6.7%). Less than one-quarter of the population (22%) had ever received training, while only 13.2% of respondents confirmed the existence of control measures. More than half (56.7%) of the participants tested their knowledge about emergency provisions which should have existed. The results demonstrate that students view essential compliance requirements differently from what the institution presently provides.

The combined staff and student results demonstrate that institutional infrastructure together with environmental provisions serve as the foundation for compliance assessment. The organisation achieves protocol compliance through training and monitoring together with dedicated resources while compliance fails when these elements are absent.

RQ3: What are the factors associated with compliance and non-compliance with health and safety standards within the buildings?

RQ4: What is the state of health and safety compliance at the institutions of higher learning existing in the buildings?

The findings show that staff safety perceptions help maintain safety standards in their workplaces, yet institutional safety measures have a greater influence on their work compliance. The study found that compliance showed a weak positive connection with both familiarity ($r = 0.25, p < .001$) and confidence ($r = 0.15, p = .019$) according to the correlation analysis. Staff members who demonstrate better safety procedure knowledge will have higher compliance rates with institutional protocols. The study found that other perception variables, such as general safety feelings, effectiveness assessment, and institutional rating assessment, showed no significant links to the results.

When all these predictors were considered collectively in the multiple regression model, the impact of perceptions decreased significantly. Only confidence emerged as statistically significant ($\beta = 0.099$, $p = 0.007$) when controlling for institutional supports such as training, controls, and placement of resources. This indicates that personal awareness and attitudes are important; however, they cannot replace institutional supports. In other words, staff may be

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aware of the procedures; however, without enforcement of rules and training, awareness is not likely to result in compliance. These results confirm that perceptions are enabling factors rather than primary drivers, reinforcing the earlier conclusion that compliance is institutionally determined.

RQ5: What is the effectiveness of existing control measures on compliance with health and safety standards?

The factor analysis of staff responses identified three latent dimensions that structure safety perceptions. The first factor represented institutional support, which had high loadings on measures of the effectiveness of existing safety measures and the institution's commitment to safety. This relates to how respondents perceive the institution's role in enforcing compliance. The second factor, representing personal awareness/confidence, had high loadings on familiarity, perceived safety, and confidence. This factor measured the degree to which participants felt knowledgeable and confident about their ability to handle the safety protocols. The third factor is related mainly to environmental factors, such as safety signs that act as an external reminder of the protocols. While this factor ranked lower as a predictor of compliance, its emergence as a separate factor speaks to the symbolic importance of signs within the overall safety culture.

Overall, these three factors of institutional infrastructure, personal awareness/confidence, and environmental factors provide a complete picture of compliance. While the institutional factors are clearly the most important, the other factors show that compliance is a multi-faceted concept that requires support at all levels.

4.2. Qualitative Findings

4.2.1. Participants demographics and profile

Table 4.14 indicates the summary of themes, subthemes and quotes from interview findings. According to Table 4.14, all the participants are qualified professionals in health, safety, or environmental management. The levels of their experience vary between 1-10 years, which gives an account of both junior and senior professionals' views.

Table 4.9. Summary of participants' educational and work-related information

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Participant (Code)	CODE	Qualification	Experience in H&S	Position	Department/Building
Interviewee 1	Int.1	BTech Environmental Health	1–5 years	Health and Safety Officer	Academic Building
Interviewee 2	Int.2	Diploma in Safety Management	6–10 years	Facilities Safety Coordinator	Administrative Services
Interviewee 3	Int.3	BSc Environmental Health	5–10 years	Health & Safety Specialist	Health Sciences
Interviewee 4	Int.4	BTech Environmental Health, Master's degree in progress	1–5 years	Environmental Health Practitioner	EMC Building

4.2.2. Presentation and interpretation of interview findings

Thematic analysis was employed as a method of interpretation of the collected data. Initial coding of all four interviews revealed patterns which formed six major themes with their related subthemes. The results are presented based on the six major themes that emerged from the analysis of the qualitative data. Each of these major themes has its related subthemes, which are based on the data collected from the participants. The actual words of the interviewees are used to highlight certain aspects of the data, which adds authenticity to the research.

Theme 1: Deteriorating Infrastructure and Poor Maintenance

This theme represents the participants' concerns regarding the physical condition of the institution's buildings, which they considered to be of critical importance for the institution to meet H&S requirements. The participants unanimously highlighted their concerns regarding the poor condition of the infrastructure

Sub-theme 1.1: Old and Unsafe Buildings

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Some interviewees noted that most buildings within the institution are old and deteriorating. Interviewee 4 said: “The walls were falling apart and had been reported for years”. Interviewee 5 added that “… most buildings have not been refurbished for decades”. This shows that most buildings within this institution are deteriorating. This could be risky since there could be falling debris, collapsing walls, or poor preparedness during emergencies.

Sub-theme 1.2: Poor Ventilation and Lighting

The participants identified ventilation and lighting as ongoing hazards. These affect productivity and health. Interviewee 3 said, “Ventilation should be prioritised in lecture halls and offices.” Inadequate ventilation can cause discomfort and even lead to respiratory problems. Moreover, inadequate lighting can cause accidents, especially in areas such as stairs and corridors.

Sub-theme 1.3: Structural Cracks and Decay

Cracks in walls and ceilings, and paint issues, were common complaints. While these issues may have been cosmetic in nature, they may have also pointed to structural weaknesses in buildings. The fact that these issues persisted despite repeated complaints may indicate a lack of accountability in maintenance management.

Interpretation

Theme 1 emphasizes the point that the physical environment within institutional buildings does not meet acceptable standards of H&S. This is supported by the findings that neglect of infrastructure is affecting compliance. This is in line with Objective 1, which emphasizes the significance of structural soundness as part of the compliance criteria.

Theme 2: Lack of Awareness, Education, and Communication

This theme shows gaps that exist within the institution's safety culture and communication. Participants noted that there is a lack of adequate knowledge among staff and students on how to handle various safety procedures.

Sub-theme 2.1: Absence of Induction and Training Programmes

All four participants mentioned that new staff and students are not given comprehensive safety inductions. Interviewee 4 emphasised that “H&S inductions for every new employee and

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student should be normalised,". The absence of a structured orientation leads to ignorance about basic procedures, emergency exits, and reporting mechanisms.

Sub-theme 2.2: Lack of Safety Awareness among Staff and Students

The participants were in agreement that the majority of staff and students on campus are unaware of the potential hazards. Interviewee 4 is of the opinion that "People don't know where to report," and this was a recurring statement, showing the breakdown in communication channels. This lack of awareness also extends to general practices such as the misuse of electrical outlets and waste disposal.

Sub-theme 2.3: Limited Communication and Reporting Channels

The participants also pointed out that H&S information is not properly shared. In addition, regarding online platforms for reporting incidents, these are either not available or do not function properly. Therefore, most incidents are not reported in time.

Interpretation

The findings in Theme 2 demonstrate that low levels of awareness and communication are major challenges to compliance. In this regard, the findings are directly related to Objective 1 and Objective 3, which focus on identifying key components in compliance and factors influencing compliance.

Theme 3: Leadership and Institutional Culture Deficiencies

This theme highlights the participants' perception of managerial commitment and the institution's culture with regard to H&S.

Sub-theme 3.1: Poor Management Involvement

Most participants expressed their dissatisfaction with the lack of managerial visibility. "The lack of response from the Facilities Department to H&S issues that are reported" Interviewe 4 illustrated a reactive rather than preventive management approach and commented about "… lack of response from the Facilities Department to H&S issues that are reported".

Sub-theme 3.2: Lack of Accountability and Follow-up

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H&S reports are often ignored or not followed up. Interviewee 3 remarked that "When requests are sent, they are either rejected or delayed for months,". This practice will also discourage staff from raising their concerns in the future.

Sub-theme 3.3: Weak Leadership Commitment to Safety Culture

The institution is committed to maintain a safety culture. However, compliance with safety protocols is a challenge. One participant, interviewee 2 emphasised that, "Leadership commitment is missing", adding that without top management buy-in, initiatives at departmental level remain unsustainable.

Interpretation

Theme 3 indicates that leadership is a critical factor that influences compliance. A strong safety culture starts with leadership example and accountability. Lack of institutional commitment undermines both staff morale and the overall effectiveness of safety measures, impacting compliance and non-compliance with H&S standards within the buildings

Theme 4: Barriers to Compliance and Enforcement

The participants identified various barriers to H&S standards enforcement.

Sub-theme 4.1: Limited Financial Resources

The participants emphasized that budgetary constraints are a major hindrance to H&S standards enforcement. Interviewee 3 stated that "Funds are not available," which captures the essence of the financial constraints in procuring H&S materials and equipment.

Sub-theme 4.2: Absence of Monitoring and Evaluation Systems

The participants agreed that no system is in place to monitor and enforce H&S standards. Interviewee 2 stated that "No management system is in place," which captures the essence of not having any digital or physical system to monitor H&S.

Sub-theme 4.3: Poorly Defined Roles and Accountability

The participants agreed that poorly defined roles and accountability are major barriers to H&S standards enforcement.

Interpretation

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Theme 4 illustrates an instance where resource scarcity and lack of monitoring and accountability contribute to non-compliance. This directly relates to factors associated with compliance and non-compliance with H&S standards within the buildings. Furthermore, it is relevant to the current compliance status of existing buildings at the selected HEI, thus proving that enforcement challenges are not individual but rather institutional.

Theme 5: Limited Effectiveness of Existing Control Measures

This theme revolves around the effectiveness of existing H&S measures.

Sub-theme 5.1: Inactive Committees and Systems

The participants in this study pointed out that despite the existence of H&S committees at the institution, they are not effective in that they hardly meet or take drastic action to address H&S issues. Interviewee 3 said: “We are at 50%, some systems are there, but they don’t work”.

Sub-theme 5.2: Inconsistent Training and Awareness Campaigns

Training sessions are not conducted at regular intervals but occur only after incidents have happened, not as a preventive measure. This has resulted in a lack of effectiveness of the control measures

Sub-theme 5.3: Weak Follow-up and Evaluation Mechanisms

Follow-up inspections of the incidents that have been reported are not consistent. Interviewee 4 said, “On a scale of 1 to 10, I would give the university a 2,” This was a startling comment made by the interviewees, which revealed their low confidence levels regarding the institution’s ability to handle the issue of safety.

Interpretation

Theme 5 has reiterated that the existing control measures are not sufficient, nor are they being followed. The research has matched with the results of the study as per the objectives, which are as follows:

Objective 4: To assess the current compliance status of existing buildings at the selected institution of higher learning.

Objective 5: To assess the effectiveness of the existing control measures on compliance with H&S standards.

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Theme 6: Influence and Motivation Factors for Compliance

This theme has dealt with the psychological and social factors that affect compliance.

Sub-theme 6.1: Role of Line Managers

The role of line managers was highlighted by the participants as an essential factor that affects compliance behaviour. Interviewee 4 stated that "People are influenced by their line managers," implying that line managers are role models.

Sub-theme 6.2: Inclusion of H&S in Institutional Events

The participants suggested that H&S awareness be included in various events that take place within the institution. This could help normalise H&S.

Sub-theme 6.3: Reactive Attitude to Compliance

A recurring pattern observed was reactive compliance. Interviewee 3 noted that "After injuries occur, people become mindful." This captures the culture of responding only after incidents and shows that motivation to comply is not constant.

Interpretation

The significance of social and behavioural factors in influencing compliance culture is emphasized in Theme 6. Proactive engagement, constant reinforcement, and modelling from leadership are critical to shifting the focus from compliance as a necessity to compliance as a value. This theme is related to Objective 5, emphasizing the human element in maintaining safety standards.

Summary of Interpretation

The expanded discussion of the themes reveals that institutional H&S challenges are complex problems that have both infrastructural degradation and cultural shortcomings as their underlying causes.

Table 4:10: Summary of themes, sub-themes and illustrative quotes from interview findings

Theme	Subthemes
Deteriorating Infrastructure and Poor Maintenance	1. Old and unsafe buildings 2. Poor ventilation and lighting 3. Structural cracks and decay

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Lack of Awareness, Education, and Communication	1. Absence of induction programmes 2. Lack of safety awareness among staff and students 3. Limited communication channels
Leadership and Institutional Culture Deficiencies	1. Poor management involvement 2. Lack of response to safety reports 3. Weak leadership commitment
Barriers to Compliance and Enforcement	1. Limited financial resources 2. Absence of monitoring systems 3. Poor accountability
Limited Effectiveness of Existing Control Measures	1. Inactive committees 2. Irregular training 3. Weak follow-up mechanisms
Influence and Motivation Factors for Compliance	1. Role of line managers 2. Inclusion of H&S in events 3. Reactive rather than proactive behaviour

The themes that have been identified in Table 4.15 are clearly aligned to the research objectives of this study. Themes such as infrastructure, maintenance, and awareness are all related to Objective 1, while hazards related to building conditions are related to Objective 2. Themes such as leadership are related to Objective 3 and demonstrate how they influence compliance. The fact that existing control systems are not always enforced relates to Objective 4, while the fact that they are mainly reactive and dependent on supervision relates to Objective 5.

Table 4:11: Thematic analysis of staff experiences and perceptions of health and safety

Research Objective	Corresponding Theme(s)	Key Linkages / Insights
Objective 1: Identify key components enhancing compliance	Theme 1 and Theme 2	H&S compliance is strengthened by proper infrastructure, maintenance, and consistent awareness campaigns.
Objective 2: Investigate existing occupational hazards	Theme 1 and Theme 4	Unsafe buildings, poor ventilation, and unregulated construction activities are major hazard contributors.
Objective 3: Discover factors influencing compliance and non-compliance	Theme 3 and Theme 4	Leadership commitment and organisational culture determine staff attitudes and behaviour toward safety.
Objective 4: Assess the current state of compliance	Theme 5	Control systems exist but lack consistent enforcement and evaluation.
Objective 5: Evaluate the effectiveness of existing control measures	Theme 5 and Theme 6	Existing measures are reactive rather than preventive; leadership and supervision directly affect their success.

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4.3. Nexus between Research Objectives and Themes

4.3.1. Presentation and interpretation of the findings from the checklist

As shown in the checklist results, there is low and inconsistent compliance in all buildings, with a few strengths in basic housekeeping and ventilation. Most buildings have recurring problems, including expired fire extinguishers, poor emergency signage, ventilation issues, poor electrical systems, and poor waste management. The above results directly support the research objectives by identifying key hazards, the institution's poor compliance, and the ineffectiveness of existing control measures.

Table 4:12. Summary of observed findings per building

Building	Observed Strengths (Checklist-Compliant Areas)	Observed Weaknesses / Non-Compliance Issues (Checklist Findings)
BHP Building	Compliant in 3 of 6 domains (50%): acceptable housekeeping, adequate ventilation, orderly workspaces.	50% non-compliance: expired fire extinguishers; incomplete inspection records; inadequate emergency signage.
Cafeteria	Compliant in 3 of 6 domains (50%): clean and organised food preparation areas; good lighting; acceptable housekeeping.	50% non-compliance: weak waste segregation; uncovered refuse bins; absence of fire safety posters and documented staff training.
Clinic	Compliant in 2 of 6 domains (33.3%): clean and sanitary environment; availability of chemical storage cabinet.	66.7% non-compliance: missing hazard labels; expired fire extinguishers; poor medical waste storage practices.
Library	Compliant in 2 of 6 domains (33.3%): well-ventilated spaces; spacious reading areas.	66.7% non-compliance: poor lighting in corners; damaged ceiling boards; partially obstructed emergency exits.
Gymnos Residence	Compliant in 2 of 6 domains (33.3%): structurally stable building; well-spaced dormitories.	66.7% non-compliance: poor ventilation; weak fire protection systems; missing emergency exit signage.
Huis Tech Residence	Compliant in 2 of 6 domains (33.3%): good housekeeping; clean shared living areas.	66.7% non-compliance: faulty electrical wiring; unlabelled fire extinguishers; blocked corridors and passageways.
Loggies Residence	Compliant in 2 of 6 domains (33.3%): clean common areas; spacious internal layout.	66.7% non-compliance: ageing infrastructure; poor waste management; inadequate hallway lighting.
Welgemoed Residence	Compliant in 1 of 6 domains (16.7%): limited clutter in some corridors.	83.3% non-compliance: expired fire extinguishers; broken emergency

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		exits; poor ventilation; inadequate housekeeping.

Interpretation

The findings from the checklist indicate that although housekeeping is in order in most buildings, fire safety, emergency preparedness, and the maintenance of equipment are still areas of non-compliance. For instance, expired extinguishers, blocked exits, and poor waste management were common in student residences. This is consistent with the findings from the interviews (Themes 1, 4, and 5), which highlighted the poor state of infrastructure, poor maintenance of buildings, and the ineffectiveness of control measures.

Thematic Summary of Checklist Findings

(a) Fire Safety and Emergency Preparedness

In all the buildings, there was some level of non-compliance to fire safety. This included expired extinguishers and the absence of inspection tags. Additionally, there was poor signage on emergency exits. In some cases, fire exit doors in residential houses were non-functional. This was a major security concern. This is in line with the participants' claims such as, "The university needs to improve its fire safety systems; extinguishers are often not serviced on time."

Interpretation

The fire safety management was found to be inconsistent and reactive in nature. The lack of routine inspections, records of maintenance, and staff training was identified. This relates to Objective 4 in assessing the current status of compliance.

(b) Housekeeping and Waste Management

The fire safety management was found to be inconsistent and reactive in nature. The lack of routine inspections, records of maintenance, and staff training was identified. This relates to Objective 4 in assessing the current status of compliance

Interpretation

Inadequate housekeeping is a reflection of poor supervision and non-compliance with occupational hygiene standards. This is related to Themes 2 and 4.

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(c) Lighting and Ventilation

The buildings, especially the library and residential areas, had substandard lighting and ventilation. This included broken fluorescent lights and closed windows. Interviewee 3 remarked that "Ventilation should be prioritised in lecture halls and offices".

Interpretation

The substandard environment highlights the relationship between deteriorating infrastructures and human welfare. This observation directly validates Theme 1, namely Deteriorating Infrastructure.

(d) Structural Integrity

Visible cracks, peeling paint, and ceiling damage were noted in several buildings, particularly in the BHP Building and Library. Although some structures appeared stable, the general ageing of facilities signals long-term neglect.

Interpretation

Structural issues pose safety and compliance risks under the National Building Regulations. The results emphasize the need to conduct periodic structural audits. This finding is consistent with Objective 1.

(e) Electrical Safety and Equipment Maintenance

Unlabelled and unmaintained electrical panels are common, especially among residences. Loose cables and missing covers were observed. These findings echo the participants' concerns that "… electrical systems are old and unsafe".

Interpretation

Electrical issues are a constant danger to people occupying these spaces. A schedule for preventive maintenance is required to reduce this risk. This finding relates to Theme 4: Barriers to Compliance and Enforcement.

(f) Signage and Communication

Across multiple buildings, safety signage was missing, faded, or outdated. Notice boards lacked updated contact information for safety officers or emergency response. The absence of

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safety posters in cafeterias and residences confirmed participants' earlier statements that "… people don't know where to report".

Interpretation

Furthermore, the absence of safety information indicates a direct correlation with Theme 2: Lack of Awareness and Communication.

4.4.3 Integrated interpretation of interview and checklist findings

The checklist observations confirm and strengthen the qualitative interview data. Both data sources reveal the following:

- Persistent infrastructure deterioration (Theme 1),
- Low safety awareness (Theme 2),
- Weak leadership and oversight (Theme 3), and
- Inconsistent control mechanisms (Theme 5).

The findings suggest that the institution's compliance challenges are not isolated incidents but rather a series of systemic failures.

Overall Interpretation

The results from the EHS checklist validate the interview results, providing quantitative evidence of non-compliance with critical safety issues. Despite the existence of various safety structures and committees, compliance remains low. The institution has shown partial compliance, which is high on basic housekeeping issues but low on emergency preparedness, maintenance, and signage. This indicates a need for integrated management systems, regular training, and leadership accountability.

4.4. Chapter Summary

The chapter provided an overview of the results of the qualitative and observational data collected from the results of the semi-structured interview study, as well as the EHS checklists. This provided an overall understanding of the H&S situation within the buildings of the HEI located within the Free State province. These results highlighted that the HEI faces various structural, cultural, and administrative challenges that hinder compliance with OHS regulations. The results of the EHS Checklists Survey further supported the interview results, providing empirical evidence of non-compliance across eight buildings of the HEI. These results highlighted that the HEI's H&S management practices are fragmented, under-resourced,

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and lack oversight. Therefore, there is an urgent need to address the issue of improving the maintenance of infrastructures, commitment of the institution's leadership, education of employees, and control mechanisms to enhance compliance with H&S regulations. Chapter 5 will be dedicated to discussions of the results and making recommendations regarding the results of this study compared to existing literature.

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CHAPTER 5 DISCUSSION OF RESULTS AND FINDINGS

5. Introduction

The chapter provides an in-depth discussion of the findings based on data gathered from survey questionnaires, semi-structured interviews, and building audits, and compares them with existing literature, theories, and occupational H&S legislation. The chapter is organized to align with the objectives and questions identified in Chapter 1. In this chapter, findings from questionnaires, interviews, and EHS checklists are integrated to provide a meaningful understanding of H&S in institutions, grounded in existing legislation.

a. Discussion of Survey Results (Questionnaires)

i. Objective 1: To identify key components of health and safety that enhance compliance within the buildings

The analysis revealed that the components necessary to enhance compliance exist within the institution in theoretical form but are poorly operationalised in practice. While the level of familiarity with safety procedures, as measured by students (M=3.08) and staff (M=3.11), was moderate, compliance with these procedures was extremely low, with staff particularly poor: only 14.5% were classified as “compliant” (M=3.11). The above analysis, therefore, reveals a significant gap between what is known and what is done.

The regression analysis has also shown that awareness is not necessarily linked to practice, but rather support factors, which include the accessibility of training, control measures, and the placement of resources, are what influence compliance. These results critique the institution’s assumption that disseminating safety information or signage is sufficient. In reality, compliance is not driven by awareness messaging but by consistent exposure to structured training and functional operational controls. To support these findings, the study conducted by Salguero-Caparrós et al. (2020) states that the lack of awareness of H&S practices affects compliance with practices. However, this finding contrasts with Ardiyanto et al. (2023), who found that complete safety signs incorporating both symbols and explanatory information significantly improved users’ understanding of hazards and their intention to comply with safety requirements

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The findings on the checklist also provide a more critical assessment of the system's inadequacies. The basic requirements, which include fire extinguishers, signs, and inspection records, were consistently expired, incomplete, or even absent. These omissions contradict the moderate "effectiveness" reported in surveys and reveal that many of the components that should enhance compliance are present only superficially. Their symbolic presence, unsupported by maintenance and enforcement, undermines the institution's ability to translate safety policy into daily practice. This disconnect suggests that the institution's safety model is weighted towards documentation rather than execution.

The implications of this objective are theoretically, practically, and legally important. Theoretically, the results lend support to systems-based safety approaches, which focus more on enablers of safety as opposed to the intentions of people; awareness of a safety issue does not, by itself, translate into a safe working environment without supportive institutional enablers. In practice, the institution will need to move away from awareness-based safety interventions towards strengthening its operations, which means that training will have to be consistent, equipment maintenance will have to be timely, and communication will need to extend beyond passive signage towards active enforcement. From a policy point of view, the institution's present arrangements do not align with the OHSA's requirement for a working environment that is "safe and without risk to health," nor with the emphasis of the ISO 45001 standard, which places importance on demonstrating its operational controls. The elements of compliance, therefore, need to be institutionalized.

ii. Objective 2: To investigate existing occupational hazards in the buildings

The results showed a myriad of occupational hazards in the institution's buildings, indicating some systemic problems in maintaining facilities. The EHS checklist, in this case, gives a disturbing report on the physical infrastructure in the institution, which is in a state of decline. The report shows expired fire extinguishers, emergency exits being obstructed, ceilings in poor condition, poor wiring, poor ventilation, and inadequate lighting in most buildings. Isiwele et al. (2013) state that expired H&S equipment is not efficient as it will not fulfil its own objective, thus compromising H&S. In residences such as Welgemoed, the compliance dropped to 16.7% in terms of safety domains, which is a worrying trend, especially concerning the institution's commitment to protecting its most vulnerable and highest-density population. The survey results indicate that students often complained about overcrowding in lecture

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rooms, poor ventilation, and poor lighting, which is worrying, considering the EHS checklist results. Structures are made/designed? in a way that accommodates a certain number of occupants; passing/exceeding? this occupancy leads to H&S issues in residential buildings (Aghayani et al. 2026). These problems, therefore, raise questions about the institution's current reactive maintenance strategy, which allows problems to develop to the point where they become systemic.

There is also an evident contradiction between respondents' moderate perceptions of safety and the objectively unsafe physical conditions captured during inspections. This contradiction points to a dangerous normalisation of risk; building users may lack the technical competence to assess environmental safety accurately or may have grown accustomed to infrastructural neglect, leading to inflated perceptions of safety. The recurrence of similar hazards in different buildings that are not related to one another indicates that there are inconsistencies or failures in the process of hazard identification, which may be a result of failure of internal monitoring mechanisms within the institution. These observations are contrary to the legislative requirements regarding fire safety, ventilation, and structural integrity under the National Building Regulations and Building Standards Act 103 of 1977. They may also indicate that the process of safety management has not been integrated into maintenance operations, which is an issue of concern for such an institution.

The implications are far-reaching. Theoretically, this study reinforces the socio-technical theory on safety, which highlights the interdependency between the environment and safe human responses; hence, safe environments precede safe responses. Operationally, the institution is obliged to develop a structured and recurring process to identify hazards, with technological support, to avoid the perpetuation of hazards. In terms of policy, the institution is at risk of non-compliance with OHSA and National Building Regulations, given the repeated non-compliance with legislation on safety. The above highlights the imperative need to incorporate hazard management in operational processes, rather than responding to crises.

iii. Objective 3: To determine the factors associated with compliance and non-compliance

The findings indicated that compliance at the institution was primarily driven by institutional conditions rather than individuals' attitudes and knowledge. The regression findings indicated

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that training, operational controls, and resource placement accounted for 89% of variance in compliance. Nwachukwu et al. (2024) state that lack of training affects the H&S, especially when it comes to practice. Moreover, perceptions such as familiarity, feelings of safety, and institutional effectiveness lose predictive value when controlled by structural variables. This indicates that compliance failures cannot be attributed to individual unwillingness but rather to insufficient institutional support and weak operational systems. Interviews corroborated this interpretation, with safety professionals describing leadership as reactive, communication as fragmented, committees as inactive, and follow-up on reported hazards as inconsistent. Collectively, these findings critique the institution's governance architecture, which appears poorly configured to support compliance across its diverse building portfolio.

The institution's limited engagement with students exacerbates the compliance gap. Only 22% of students reported receiving safety training, while 89% were unaware of safe places, and 40.1% had never been informed about safety issues. The finding is supported by recent research by Cundy (2026), who notes that student engagement in safety training and awareness programmes remains low in many HEIs, largely owing to ineffective communication strategies and limited participation, resulting in poor awareness of emergency procedures and safe spaces. This neglect effectively renders students invisible in the institution's compliance ecosystem despite their being its largest category of facility users. Faculty-level disparities in staff perceptions and experiences, evidenced by significant ANOVA differences across all measured variables, further illustrate inconsistent implementation of safety programmes. These disparities indicate that compliance is largely determined by local management practices rather than by institutional standards, undermining any expectation of uniform risk management. The finding is supported by recent research by Hale and Borys (2021), who argue that workplace safety compliance is often shaped by local managerial practices and interpretations, rather than by formal institutional standards, leading to inconsistencies in risk management across organizations. The non-compliance at the institution is structurally produced rather than behaviourally chosen. In contrast, Mtikitiki and colleagues (2025) argue that moderate perceptions of safety-control effectiveness should not automatically be interpreted as evidence of partial implementation, as formally established occupational health and safety management systems can improve hazard control, regulatory compliance and safety awareness. Moderate ratings may therefore reflect differences in

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employees' awareness or experience of existing controls rather than deficiencies in the controls themselves.

The implications highlight important lessons. Theoretically, this validates organisational safety theories that assert that compliance is a function of system design and not individualistic conduct. In practice, the institution needs to re-engineer its governance structure to include oversight mechanisms that are enforceable, faculty-level targets for safety performance, training schedules, and reporting structures for follow-up actions on identified hazards. Policy-wise, the institution needs to ensure that existing safety policies are not only documented but also enforced, monitored, and audited in all faculties and residences to meet OHS obligations.

iv. Objective 4: To assess the current state of compliance in existing buildings

The state of compliance across the institution is fragmented, inconsistent, and far below the expected legal and institutional standards. Staff compliance was only 14.5%, and building compliance ranged from 45% to 67% across domains, revealing substantial infrastructural and procedural deficiencies. The variability is supported by recent findings from Manu et al. (2021), who highlight that compliance levels in built environment settings often fluctuate significantly across domains, reflecting uneven implementation and monitoring practices, with overall compliance frequently falling within moderate ranges rather than achieving full adherence. The lack of student compliance data within the dataset indicates a methodological failure that mirrors the institution's operational failure to manage student safety behaviour effectively. The moderate perceptions of student safety do not correlate with the results of the checklist that revealed critical deficiencies within the building conditions. These inconsistencies indicate that perceptions are not an accurate method of determining actual student safety performance, which creates a disconnect between user perceptions and the reality of environmental risks. In contrast, Claro et al. (2025) found that structured occupational health and safety management systems can promote consistent implementation, monitoring and organisational performance across different operational areas. This suggests that variations in compliance are not inevitable and may be reduced through standardised procedures, effective supervision and continuous evaluation

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The considerable differences at the faculty level in staff perceptions further indicate that compliance does not occur uniformly across the institution. The differences observed with respect to familiarity, confidence, and effectiveness indicate that leadership involvement, resource allocation, and departmental commitment to safety are not uniform. This finding is supported by recent work by Toole (2020), who argues that variations in familiarity, confidence, and perceived effectiveness of safety systems are often driven by inconsistent leadership involvement, uneven resource allocation, and differing departmental commitment to safety practices across organisations. This, again, does not comply with the concept of standardized risk management as emphasized by both OHSAS and ISO 45001. The results of the checklist, which revealed the presence of structural risks, the absence of documentation, and the ineffectiveness of safety controls, indicate that the institution's safety systems have not been implemented at a deeper level. The institution appears to be reactive, dealing with issues only when they become apparent. This finding is supported by Hale et al. (2021), who note that organizations with weak safety cultures tend to adopt a reactive approach, addressing hazards only after incidents or visible problems occur rather than through proactive risk management systems.

This has a number of implications. First, in terms of theory, this study supports the need to emphasize the use of objective audit evidence in evaluating compliance, rather than perceptual evidence, which may mask structural risks. In terms of practice, what this means is the institution has to develop a continuous improvement strategy by introducing building-level compliance dashboards, independently verified audits, and a requirement to follow up on each identified non-compliance. In terms of policy, the implication is that the institution has to ensure alignment with OHSA and ISO 45001 by introducing traceable inspection cycles, recording actions, and ensuring compliance at all faculty and residence levels.

v. Objective 5: To evaluate the effectiveness of existing control measures

However, while staff and student perceptions of the effectiveness of existing safety controls were moderate (M = 3.04 for staff and M = 3.19 for students), the findings of the checklist are not in line with this positive perception. This finding is supported by Hale and Borys (2021), who indicate that moderate perceptions of safety control effectiveness often reflect partially implemented safety systems, where controls exist but are inconsistently applied or

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inadequately reinforced across organisations. Many of the existing control measures, for instance, fire extinguishers, exits, signs, and waste disposal systems, were found to be not functioning properly, expired, or not properly maintained. Such findings are supported by Manu et al. (2021), who highlight that poor maintenance of critical safety infrastructure such as fire equipment, emergency exits, signage, and waste systems is a common indicator of weak safety management systems and inadequate inspection regimes in institutional buildings. Such findings point to an important gap in perceived and actual effectiveness. Findings from the interview schedule with safety professionals also supported the finding that follow-up practices are not effective at the institution. They mentioned that committees were not effective in monitoring, inspections were not done frequently enough, and responses to reported hazards were not consistent. This suggests that the institution's safety controls might not be operationally resilient and are not supported by an effective monitoring system.

The lack of evenness in the effectiveness of control systems in different buildings also reveals further structural weaknesses. The lack of evenness in the effectiveness of control systems in different buildings is supported by Borys et al. (2021), who argue that inconsistencies in safety control performance across facilities often result from fragmented implementation practices and varying levels of local management oversight within organisations. Some of the facilities showed satisfactory housekeeping and ventilation practices, while others, especially the residences, showed chronic problems. This reveals a lack of standardised control practices throughout the campus. The failure of the institution to monitor its basic safety controls also reveals a lack of commitment to the principles of ISO 45001, which require the verification of the effectiveness of its control systems and a commitment to improve its performance continually. The lack of effective control systems means that the institution cannot really provide a safe working and learning environment, which is also a legal requirement.

The implications of this objective are broad. From a theoretical perspective, the findings lend further credence to the premise that safety controls should be evaluated based on actual performance rather than on perceptions. In practice, the institution needs to develop measurable performance criteria to measure the effectiveness of its safety controls, which includes routine verification, tagged equipment, and safety actions. Policy implications are also derived from the institution's need to demonstrate its compliance with both OHSA and ISO 45001 standards. This requires not only that safety controls are in place but also that they

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are inspected, maintained, and tested.In contrast, Mtikitiki et al. (2025) argue that well-established occupational health and safety management systems provide a structured and standardised approach to hazard identification, monitoring and regulatory compliance across university facilities. This suggests that differences in control effectiveness between buildings are not inevitable and can be minimised through institution-wide procedures, clearly assigned responsibilities, continuous monitoring and consistent management commitment.

b. Discussion of Interview Findings

Theme 1: Deteriorating Infrastructure and Poor Maintenance

Throughout the interview process, the interviewees have raised the issue of deteriorating infrastructure, citing old buildings, poor ventilation, defective lighting, and cracks on the ceiling and walls of the university buildings. Such findings are supported by Wargocki (2021), who highlights that ageing infrastructure in educational buildings is often associated with poor ventilation, inadequate lighting, and structural deterioration, all of which negatively affect occupant health, safety, and overall building performance. This resonates with the observations made during the checklist process, which observed deteriorating infrastructure at the Library, the BHP Building, and the residences, with issues such as damaged ceiling boards, defective electrical systems, and poor ventilation. The interviewees' claims of "… the walls were falling apart …" and "… ventilation should be prioritized …" indicate a lack of a proper maintenance culture at the institution which has been poor over time.

Critically, this theme also reveals a pattern of tolerating infrastructure deterioration up to a point when hazards reach a critical level. The interview respondents frequently cited examples of requests for maintenance being ignored or delayed for months. This, in a way, reveals a lack of accountability within the system, which also has a fragmented approach towards facilities management. Expired fire extinguishers, cracked walls, improper medical waste storage, and malfunctioning emergency exit in several facilities, also supporting the argument that there is neither preventive nor monitoring maintenance. This finding is supported by Manu et al. (2021), who argue that the presence of defective safety systems and deteriorating building elements is a clear indicator of the absence of preventive and routine maintenance, as well as weak monitoring and inspection practices in institutional facilities. This amounts to non-compliance with the obligations under the Occupational Health and Safety Act, which

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requires the workplace to be safe and free of hazard. The interviews, therefore, reveal a structural risk landscape in which the physical environment plays a critical role in facilitating non-compliance.

This theme suggests that effective H&S management cannot be achieved without a stable and well-maintained infrastructure. In theory, an environment in disrepair challenges the foundational principles of OHS, which emphasize structures as integral components in H&S management. In practice, the institution needs to transition to a more proactive approach to maintaining structures with schedules for inspection and monitoring. In policy terms, failure to maintain structures violates both the OHSA and National Building Regulations.

Theme 2: Lack of Awareness, Education and Communication

The interviewees frequently emphasized the severe lack of induction, orientation, and training for both staff and students. This finding is supported by Toole (2020) and Khafiso et al. (2024, 2025), who emphasise that inadequate induction, orientation, and ongoing safety training significantly undermine awareness and safe behaviour among both staff and users, contributing to heightened exposure to hazards in institutional environments. Some interviewees mentioned that "… people don't know where to report …" hazards. They emphasized that there were no safety briefings for neither employees nor students. This observation corroborates the survey findings that only 22% of the students have ever received any kind of safety training, while 40.1% of the students have not been given any kind of safety communication. This finding is supported by Hale et al. (2021), who note that low levels of safety training and poor communication are common in organisations with underdeveloped safety management systems, resulting in limited awareness and preparedness among users. This suggests that there is a failure in the institution's learning process regarding H&S. The failure to communicate regularly to the staff and students directly affects compliance, especially when people are expected to make assumptions rather than relying on correct, proven facts.

The criticism of this theme is that it focuses on communication as a passive, administrative necessity, rather than a dynamic, strategic aspect of organisational safety. The interviewees highlighted the recurring failure of communication, outdated information boards, and a lack of understanding of roles and responsibilities in emergency situations. This shows a fractured approach to internal communication, which does not prioritise safety information. The lack of

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training, coupled with a lack of understanding, means a workforce is unaware of procedures, unsure of emergency procedures, and not prepared in hazard identification. This is a failure of the requirements outlined in the ISO 45001 standard on worker involvement, information, and training in safety processes.

The implications of this theme are clear. Theoretically, the findings support the notion that awareness and education are essential to an effective safety culture. Practically, CUT should establish training programmes, training cycles, and various platforms of communication to facilitate the flow of safety information to all users. Policy-wise, it appears that CUT is not meeting the OSHA requirement of providing adequate information, instruction, and supervision.

Theme 3: Leadership and Institutional Culture Deficiencies

The interviewees were highly dissatisfied with the involvement of the institution's leadership regarding H&S issues. This finding is supported by Toole (2020), who emphasises that leadership commitment plays a critical role in shaping H&S performance, as weak leadership involvement often results in poor prioritisation, inadequate resource allocation, and ineffective implementation of safety practices. This is because there was a lack of follow-up on complaints, limited visibility of the leadership, and a general lack of urgency on the part of the managers regarding H&S. The fact that the facilities department does not respond to issues or that it takes months to act on a complaint point to a leadership structure that seems to be disconnected from the reality of the situation. This points to a culture that does not view H&S as an institutional priority.

Critical interpretation of this shows that the poor leadership skills have a trickle-down effect on the school's safety culture. This is because if the school's managers are not concerned, the students will internalize that their safety is secondary. The inactive safety committees described in interviews further confirm that there might be leadership's lack of commitment to safety governance. The apathy of the school's managers does not only hinder corrective action towards improving student safety but also breeds distrust, demoralization, and unsafe behaviour. This finding is supported by Reason (2016), who argues that weak managerial commitment to safety undermines trust, reduces morale, and fosters unsafe behaviours, as leadership inaction signals that safety is not a priority within the organisation.

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The implications of this theme highlight the necessity of transformation in the realm of leadership. Theoretically, the findings support safety models centred on leadership, which emphasize the necessity of cultural transformation from the top. In practice, the institution needs to incorporate safety accountability in its evaluation of managerial performance and make it a requirement for leaders to participate actively in inspections, training, and committee work. The enforcement of policy compliance also needs to be backed by the commitment of the leadership, as emphasized in both OHSA and ISO 45001, which currently seems not to be happening.

Theme 4: Barriers to Compliance and Enforcement

The study findings indicated that there were structural and administrative barriers to compliance that were evident from the interviewees' statements that pointed to insufficient financial resources, role definitions, monitoring systems, and departmental responsibilities. This finding is supported by Hale and Borys (2021) and Khafiso et al. (2024) who argue that structural and administrative barriers such as inadequate resources, unclear roles, weak monitoring systems, and fragmented responsibilities significantly constrain effective H&S compliance within organisations. For instance, they noted that there is "… no management system in place to address this issue …", implying that there is a failure to address hazard reporting. There is institutional paralysis that occurs even when there is identification of hazards that does not prompt any action. The similarity between these statements and these recorded in the checklist that indicate failure to maintain inspection logs, poorly maintained safety equipment, and non-compliance suggests that there is failure at every enforcement level.

The criticism of this theme is that there are enforcement mechanisms in place, though in a fragmented fashion without systemic integration for the management of safety. There is a disjointed environment where there is duplication of roles that are not clearly understood, causing delay and non-action. This is evident from the fact that there is non-compliance with the rules at most buildings. The absence of monitoring and evaluation processes also contradicts the ISO 45001 requirement for continuous improvement and undermines institution's capacity to meet statutory duties under OHSA.

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The implications of this theme indicate that compliance cannot be improved without resolving foundational governance barriers. Theoretically, the findings highlight the importance of system integration for safety enforcement. Practically, the institution must establish clear reporting lines, centralised monitoring mechanisms, and dedicated enforcement procedures. Policy alignment requires operational systems that demonstrate monitoring, documentation and accountability, all of which are currently absent.

Theme 5: Limited Effectiveness of Existing Control Measures

The existing control measures, as reported by the interview participants, were deemed ineffective, inconsistent, and inadequately monitored. Some of the respondents gave a very low rating on the safety performance of the institution, stressing the inactivity of committees, follow-up mechanisms, and training. The perceptions expressed by the respondents in the interviews correlate with the findings of the physical audit, which showed a lack of compliance in critical safety control measures, including fire extinguishers, emergency exits, ventilation, and signage. This finding is supported by Manu et al. (2021), who highlight that non-compliance with essential safety control measures such as fire protection systems, emergency exits, ventilation, and safety signage is a common indicator of ineffective safety management and regulatory enforcement in building environments. The interviews showed a system that focuses on documentation but fails in execution.

Critically, however, the interviews reveal a situation where corrective actions are not tracked, inspections are not frequent, and safety systems are not improving but are static. This is in direct contrast to the ISO 45001 standard that requires organizations to demonstrate a process for continually improving. This further reinforces that the control measures adopted by institution are more symbolic in nature. The repeated nature of similar issues in different buildings suggests that they are not isolated incidents but are more a function of oversight. Staff perceptions confirm that users appear not to trust the reliability of existing controls, which further undermines safety culture.

The implications indicate that control effectiveness must be measured through outcomes rather than intentions. Theoretically, this theme supports performance-based views of safety. From a practical point of view, the institution must establish measurable indicators of control functionality, as well as scheduled audit commitments with corrective actions. From a policy

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point of view, institution must demonstrate compliance with OHSA and ISO 45001 by ensuring that all controls are inspected, serviced, and verified.

Theme 6: Influence and Motivation Factors for Compliance

The interviewees emphasized the impact of line managers in influencing staff compliance to safety, as individuals tend to follow the safety attitudes and practices adopted by line managers. his finding is supported by Hale et al. (2021), who note that line managers play a pivotal role in shaping safety compliance, as employees tend to mirror the attitudes, priorities, and practices demonstrated by their immediate supervisors, thereby influencing overall safety behaviour within organisations. This refers to a decentralised culture in which individuals are influenced by what is practiced around them rather than what is practiced in an organisation in general. Additionally, participants described compliance as largely reactive, noting that staff "become mindful only after injuries occur." This, in essence, shows a lack of proactive motivational strategies, which means that the safety behaviours are being triggered by incidents rather than reinforcement.

Critical Evaluation

Based on the above analysis, it is quite obvious that the institution is not providing enough positive reinforcement to the employees in order to sustain the safety behaviours. Safety is not integrated into institutional events, communication campaigns or leadership messaging, limiting opportunities to shape user motivation. The lack of behavioural reinforcement is especially detrimental when coupled with inadequate institutional controls and lack of leadership engagement. These factors, in combination, can create a situation in which motivation is lacking, and a culture of episodic compliance persists.

The implications of this theme highlight the importance of cultural change and leadership modelling. Theoretically, the findings validate behavioural safety frameworks that highlight the importance of reinforcement and role modelling. In practice, CUT must incorporate safety into regular institutional communication, leadership briefings, and staff development activities. Policy alignment requires embedding safety expectations into managerial roles, ensuring that supervision meets OHSA requirements and conforms to ISO 45001 principles of worker participation and engagement.

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Discussion of Checklist (Building Survey) Findings

The checklist results represent the most objective and verifiable data on the institution's H&S performance. They show a clear pattern of partial, inconsistent, and at times critically inadequate compliance. The quantitative results on compliance levels range from 45% to 67% in most of the audited structures. This data clearly shows that none of the audited structures meets the minimum standards expected in a safe academic and residential setting. This is in direct contrast to the moderate perceptions of safety reported in the surveys. This would imply that users tend to overestimate the institution's preparedness. What is evident in the checklist results is the significant level of operation deficiencies in fire safety, emergency preparedness, structural integrity, and environmental hygiene. Classic deficiencies such as expired fire extinguishers, blocked emergency exits, lack of hazard labels, poor lighting conditions, and unlabelled electrical equipment were evident in all the audited structures. This finding is supported by Manu et al. (2021), who identify common safety deficiencies such as poorly maintained fire equipment, obstructed exits, inadequate signage, and unsafe electrical conditions as recurring indicators of weak compliance and ineffective safety management systems in building environments. These include the library, clinic, lecture halls, laboratories, offices, and all the residential halls. The recurrence of similar hazard categories in a number of structures points to institutional failures.

A critical analysis of the findings of the checklist reveals that high-risk deficiencies remain unresolved, even when they are legally mandated and operationally critical. For example, fire safety is one of the areas in which the majority of the buildings scored low. The extinguishers in the buildings were not serviced or expired or had no records of inspections. The exits in the buildings were also not working properly, and there were many cases in which the exits were obstructed. The signage at the exits, which is critical in guiding individuals in case of an emergency, was also lacking or not clear. These findings, therefore, violate the provisions of the Occupational Health and Safety Act (1993) and the National Building Regulations (1977), which require that the equipment be serviced, accessible, and always indicated. The findings of the checklist, therefore, reveal a failure in monitoring compliance and follow through. These are critical safety issues, and their state reveals a failure of control in the institution.

The checklist also indicates that there is a worrying gap between buildings in terms of performance, with residences underperforming compared to academic and administration buildings. For example, one residential building had only 16.7% compliance in one of the

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critical safety domains. This finding is supported by Manu et al. (2021), who note that critically low compliance levels in key safety domains often reflect serious deficiencies in enforcement, monitoring, and the implementation of safety management systems within built environment contexts. One residence had many critical hazards that had to be addressed, including broken emergency exits, ventilation, and housekeeping. Similarly, two other residential buildings had many indicators of aging infrastructure, poor waste management, insufficient hallway lighting, and faulty wiring. This indicates that there is a worrying gap in investment in safety between academic buildings and residences, where many students are daily residents. This is a worrying trend that undermines the university's commitment to student well-being and increases the overall campus risk profile. It is also contrary to the principle of uniform management of risk, which is a requirement of both ISO 45001 and OSHA.

Another significant insight gained from the checklist is the apparent failure in the regular process of monitoring and maintenance. Many of the hazards identified, such as expired extinguishers, poor lighting, unmarked fire apparatus, and blocked corridors, would have otherwise been identified in the regular process of inspection and maintenance. Their presence suggests that regular inspection practices, when they exist at all, are not being recorded, followed up on, or acted on. The lack of inspection records in some of these establishments also speaks to institutional accountability and creates a situation in which the recurrence of hazards is almost predictable.

This weakness also reflects failures in the “Check” and “Act” stages of the Plan-Do-Check-Act (PDCA) model central to ISO 45001. Thus, without proper evaluation and corrective action, safety systems become stagnant and, over time, deteriorate, as was evident from the audit results.

Furthermore, the checklist's emphasis on environmental issues highlights inconsistencies in the operation of a healthy, hygienic interior space. Inadequate ventilation, poor lighting, and waste management are common issues, especially in the clinic, cafeteria, and student residences. These not only add to the hazards but also have a direct impact on the quality of indoor air, comfort, and health of the occupants. The recurrence of these issues across various buildings highlights a disjointed approach towards environmental health, which goes against the fundamental principles of occupational health. The audit also revealed poor housekeeping

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habits, which indicates a lack of proper delegation of safety responsibility. If the results of the checklists are examined collectively, it appears that the institution is struggling to overcome problems related to its own safety management systems. The physical results appear to indicate that it is not a case of a lack of awareness, but rather one of lack of oversight by the institution's leaders. Furthermore, it appears that many of the hazards are not necessarily those that require any significant investment of either expertise or financial outlay but merely require concerted efforts towards monitoring and enforcing. The checklists, therefore, appear to be an exercise that highlights the fundamental structural problems that are affecting compliance within the institution.

The implications of this are considerable. Theoretically, it appears to support the notion that the environment plays a fundamental role in determining occupational safety, potentially even more so than attitude or awareness. In practice, the institution should urgently implement a structured preventive maintenance programme supported by building-specific inspection calendars, digital reporting systems, and documented corrective action logs. Such measures are essential for eliminating the habitual recurrence of easily preventable hazards. From a policy perspective, the findings make clear that the institution is falling short of OHSA and National Building Regulations' requirements, particularly with respect to emergency equipment maintenance, structural integrity and safe egress routes. Achieving compliance will require not only corrective actions but a reconfiguration of governance structures to ensure sustained monitoring, accountability and enforcement.

Overall Discussion of the Study Findings

The overall discussion integrates the results of the survey, interview, and checklist to create a comprehensive understanding of the institution's H&S. This triangulation of data helped to validate that the H&S environment within the institution is influenced by various interrelated factors. This integration of various data sources adds validity to the study, providing a greater understanding of the interplay of awareness, leadership, and infrastructure within HEIs.

The collective findings reveal that partial compliance exists across most of the assessed domains, with the institution performing moderately well in areas such as basic housekeeping and sanitation, but poorly in areas such as fire safety, emergency preparedness, and continuous monitoring. This trend in partial compliance with H&S regulations is not limited to the case institution, but rather it is a systemic problem, as noted in higher learning facilities in South

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Africa, as discussed by Machabe and Indermun (2013) and Hattingh (2020). The above authors have noted that even though OHS structures may be in place in these facilities, they may not be functioning effectively owing to poor leadership commitment, lack of funding, and technical expertise

The convergence of both findings from the interview and checklist approaches reveals a critical gap in the policy and practice divide. While the institution operates in compliance with the provisions set by the National Building Regulations and Building Standards Act (Republic of South Africa, 1977) and the Occupational Health and Safety Act (Republic of South Africa, 1993), there is a glaring absence of internal mechanisms to ensure compliance. The Occupational Health and Safety Act (Republic of South Africa, 1993) stipulates that employers must ensure a safe working environment, regularly carry out risk assessment, and ensure the availability of safety gadgets; yet expired fire extinguishers, non-functional exit doors, and poorly maintained electrical gadgets were evident. This non-compliance is a direct affront to both the legislation in the country and the provisions set by the ISO (2018), which encourages the proactive identification, assessment, and management of workplace risk.

The interview findings provided further insights into the reasons for these gaps. H&S practitioners pointed to the lack of involvement from the top management and poor departmental coordination. The leadership and management were seen to be apathetic to the issue. This is supported by earlier research works such as that of Van Niekerk (2013) and Hughes and Ferrett (2020), who emphasized that for effective OHS management to occur, there is a need for management to be visible, accountable, and to have a culture of safety that is clearly communicated to the workforce. The failure to prioritize these initiatives is a manifestation of the gap between policy and practice.

The study also revealed that financial limitations were another factor that contributed to non-compliance. Budgetary limitations were evident from the findings of the interviews conducted for the study and from the information gathered from the checklist. This is supported by another research work done by Bao et al. (2022), who pointed to the fact that scarcity of resources in developing institutions forces management to adopt a reactive approach to maintaining their infrastructure. The present study's results confirm this, revealing that corrective measures are typically initiated only after hazards become visible or after incidents occur. This reactive approach also echoes the Plan-Do-Check-Act approach as described by

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the ISO (2018). This approach indicates that the institution's weaknesses are mainly centred on the "Check" and "Act" phases, which are essentially linked to evaluation and improvement.

The quantitative findings supported this qualitative analysis, as they revealed that although employees and students are aware of H&S principles, they are not aware of reporting mechanisms. This observation confirms Hattingh's (2020) assertion that awareness among HEIs is usually carried out on a piecemeal basis without any follow-up. This contradiction between awareness and actual behaviour indicates that awareness does not always translate to compliance without any reinforcement, enforcement, or motivation. The lack of induction training and safety training for employees also contradicts the safety management approach as advocated by Hughes and Ferrett (2020).

Moreover, the findings suggest that compliance is often influenced by social and behavioural factors. The importance of line managers' influence, as highlighted by the interview results, suggests that compliance behaviour is largely influenced by interpersonal interactions rather than institutional systems. This resonates with the views of Van Niekerk (2013) that safety culture is socially constructed within an organization and that it relies significantly on the behaviour of the leaders. Therefore, the effectiveness of safety initiatives depends on the extent to which managers are able to model safe practices.

The integration of the EHS checklist data with the interview results further demonstrates that the most significant challenges are embedded in the institution’s operational culture rather than regulatory framework. The legislative and policy environment of South Africa, such as the OHS Act, the Constitution of the Republic of South Africa, (1977), and the ISO (2018) offers a strong base to support compliance. However, the implementation of the institution is challenged by fragmented communication, lack of coordination between departments, and poor monitoring mechanisms. This validates the assertion of Ou and Thygerson (2012) and Mbuligwe (2002) that compliance failure within public institutions is not necessarily due to a lack of regulation but rather poor institutional enforcement.

Another significant point that this study revealed is that there is a lack of an integrated management system that incorporates various departments such as Procurement, Facilities, Risk, and Compliance. This separation of duties results in inconsistent decision-making processes. This issue mirrors the argument of Hughes and Ferrett (2020) that emphasized the importance of a holistic safety management system that incorporates all the various

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departments of an organization under one compliance umbrella. This will help to facilitate real-time monitoring of incidents, maintenance, and resource allocation.

Overall, it can be concluded that the overall discussion of this study highlights that the H&S of the institution can be categorized as suffering from structural as well as cultural problems. This can be evidenced by the deteriorating infrastructure of the institution, the lack of awareness, and the commitment of the institution's leaders. To overcome this situation, it is essential that the institution adopts a shift from a reactive to a proactive H&S culture.

It is for this reason that the overall findings of the study affirm the existing knowledge base through the demonstration that the issue of compliance in South African higher learning institutions is multidimensional. It is not only a question of physical security arrangements; rather, it is more fundamentally related to organisational dynamics. The study's findings, therefore, provide additional evidence to the theory that for sustainability of compliance to be achieved, there is a need to have a holistic management system in place.

Chapter Summary

The chapter provided an overview of the discussion and interpretation of the results of the study based on the findings of the survey, semi-structured interview, and EHS checklist. The results of the study indicated that there was partial compliance with OHS standards within the institution. The employees were aware of the various safety procedures; however, this awareness was not effectively translated into practice. The results of the study also indicated that there were problems of leadership, communication, and resource allocation that hindered H&S compliance within the institution.

The results of the EHS checklist were consistent with the results of the interview findings. The results of the study indicated that there were various structural problems that hindered H&S compliance within the institution. Based on the results of the study, it can be concluded that there are various problems that hinder H&S practices within the institution. These problems are mainly related to the leadership, resource allocation, and culture of the institution. The following chapter will present the conclusions of the study, which are based on the results of the study. The conclusion is followed by the recommendations of the study.

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CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.0. Introduction

This chapter comprises a comprehensive synthesis of the entire study's findings. It is composed of the conclusions and recommendations. The study, the title of which is "Assessing H&S Conditions in the Buildings at an Institution of Higher Learning in South Africa: A Case in the Free State Province", sought to assess the existing H&S conditions within the institution's buildings, determine the compliance of the existing H&S conditions with the national standards, and assess the factors that influence the effectiveness of OHS management.

The chapter is composed of an overview of the significant findings that are associated with the research objectives. This is followed by the conclusions that are based on the entire study's findings. The significant findings that were highlighted in Chapter 5 of the study revealed that the institution has all the necessary legislative and policy requirements. However, there are problems that are associated with the implementation of the requirements. Therefore, this chapter is composed of the consolidation of the study's findings.

6.1.Summary of Key Findings by Research Objective

6.1.1. Objective 1: To identify key components of health and safety that enhance compliance within buildings

The findings of this study show that several core components are essential for enhancing H&S compliance within the institution's buildings. These include the quality of infrastructure, the functionality of fire safety measures, the effectiveness of ventilation and lighting, and the visibility of emergency preparedness. While these factors have been formally acknowledged in the institution's policies, the findings from the questionnaires and interviews, as well as the results from the checklist inspection showed inconsistencies in their practical implementation. For instance, the lack of induction procedures for staff and students, the lack of consistency in communicating safety procedures, and the lack of maintenance of basic safety equipment undermined the institution's capacity to attain consistency in compliance.

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As a result, most users, particularly students, showed limited exposure to training, despite showing moderate confidence in their knowledge of safety procedures. This reveals that the institution relies heavily on policy frameworks and physical infrastructures. However, it does not ensure their maintenance and operationalisation. This disjointed approach to safety compliance was evident in the absence of maintenance schedules and the lack of enforcement in induction and safety education. This is in keeping with the notion that compliance must be continually educated, engaged, and monitored rather than relying on documentation and ad hoc communication.

6.1.2. Objective 2: To investigate the existing occupational hazards in the buildings of the selected institution of higher learning

The research revealed a variety of occupational hazards in academic buildings, service areas, and residential spaces. Many of these hazards present immediate and long-term safety hazards. Structural hazards such as cracked walls, ceilings, and unstable fittings were common in the academic buildings. Similarly, ventilation and lighting hazards were also prevalent in the academic buildings, as well as the library and residential spaces. At the same time, trip hazards such as cluttered corridors and blocked emergency routes were also identified in high-traffic areas. This was compounded by non-functional fire safety measures such as expired fire extinguishers, lack of hazard labels, and non-functional emergency exit doors. The clinic and cafeteria spaces also presented a variety of hazards relating to poor waste disposal and chemical storage

Such hazards, therefore, imply a chronic problem in hazard identification, risk assessment, and maintenance oversight. The construction zones were not clearly marked, which meant there was unnecessary exposure of staff and students to physical hazards. The recurrence of the same hazard in different buildings indicates that there is a problem in the implementation of the entire risk management process. This is in line with the relevant literature, which indicates that a deterioration in educational facilities and hazard oversight contributes significantly to occupational risk exposure. The recurrence of the hazard indicates a failure in the implementation of proactive safety measures in the institution.

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6.1.3. Objective 3: To determine the factors associated with compliance and non-compliance with health and safety standards within the buildings

The most important factors influencing compliance were organisational rather than individual. Non-compliance was closely related to low leadership commitment, ineffective communication channels, ambiguous reporting structures, inadequate oversight, and insufficient funding for maintenance and safety programme initiatives. Many staff expressed that when they raised safety concerns with the Facilities Department, these were not addressed or it took an inordinate amount of time to be addressed. The interviewees also expressed the view that safety committees were not functioning and that follow-up with regard to identified hazards was inconsistent or non-existent. Moreover, the students highlighted the barriers to compliance, which were numerous, ranging from lack of access to training to lack of clarity on emergency information and reporting channels. All this buttresses the overall conclusion that compliance is being undermined by factors related to the institution, mainly the fragmented organisational culture. The lack of disengagement by the leadership and poor interdepartmental coordination were highlighted as some of the factors contributing to the inconsistent application of safety measures across the campus. This is in line with previous research indicating that poor leadership structures contribute to poor compliance in higher learning settings.

6.1.4. Objective 4: To assess the current state of compliance in existing buildings at the selected institution of higher learning

The findings of the Environmental Health and Safety Checklist indicated that compliance within the institution's buildings is partial and below what would be expected within a higher learning environment. Overall compliance ranged between 45% and 67%. This indicates that although some forms of compliance exist, they are not adequately implemented, monitored, or maintained. The most common forms of non-compliance within the area of fire safety preparedness included expired extinguishers, incomplete inspection records, and broken exits. Other forms of non-compliance included issues with signage, lighting, and waste management. While the institution may be formally committed to compliance with various acts of parliament, such as the National Building Regulations of 1977, the practical implementation of such requirements during the inspections was not evident. The results revealed that there were a number of buildings that lacked inspections and maintenance to

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ensure compliance. These results are consistent with previous studies that have revealed that institutional compliance will deteriorate if there are inconsistencies in the enforcement of regular inspections and maintenance. The inconsistency of compliance may also point to the fact that there are no standardised safety protocols.

6.1.5. Objective 5: To assess the effectiveness of the existing control measures on compliance with health and safety standards

The study concluded that the control measures that were already in place, including the safety committees, training programmes, and inspection procedures, were ineffective owing to the lack of consistent application of these measures. Additionally, there were poor follow-ups and insufficient monitoring of these control measures. The perception of the control measures among staff members was generally low. The study concluded that the control measures were more reactive than preventive. The results of the checklist were consistent with the perception of the control measures being ineffective. There were repeated failures of critical safety measures, especially in areas that were normally checked during routine inspections.

The study concluded that control measures were present at the policy level but were not operational at the execution level. Training programmes were irregular, safety committees were not visible, and corrective actions were not fully tracked to completion. This is a common case of stagnation in institutions where control measures are put in place only after certain occurrences. This is similar to the common problem in the ISO 45001 literature, where institutions are more likely to fail in the "Check" and "Act" steps of the PDCA cycle. CUT's control systems, therefore, require substantial restructuring to transition from reactive compliance to proactive, sustainable safety management.

6.2. Conclusions

The conclusions drawn in this study are a synthesis of the major findings in line with the empirical results and the theories and literature reviewed. The conclusions drawn in this study are that systemic deficiencies, infrastructural shortcomings, and strategic leadership apathy characterize occupational H&S management in the institution. While policies and legislative

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frameworks are in place in line with national and international standards, enforcement is lacking.

6.2.1. Leadership and institutional commitment

On one hand, leadership is at the heart of developing a compliance and safety culture. However, the research revealed that the involvement of the institution's management in H&S issues is very low. The institution's OHS committees are present but inactive. Follow-ups on reported cases are also non-existent. This does not show commitment to H&S. This supports the findings by Hughes and Ferrett (2020) that the involvement of the institution's management in H&S issues is very low. Their findings also supported those by Van Niekerk (2013), which indicated that safety management should involve the participation of the institution's management in H&S issues. This should also involve regular inspections and the integration of safety in performance evaluation systems.

6.2.2. Infrastructure and maintenance

The physical condition of the university's buildings is another significant factor that leads to non-compliance. Buildings that are deteriorating, have poor lighting, and bad ventilation are unsafe working conditions. The study suggests that without regular maintenance, there will be continued infrastructural hazards. This study agrees with the findings by Nadzim & Taib (2014) and Kodur et al. (2019) that infrastructures that are neglected will lead to safety risks and future maintenance expenses.

6.2.3. Safety awareness and communication

A lack of safety awareness and communication channels among staff members and students have been identified as some of the issues. Despite the existence of safety policies, most employees and students are not aware of the reporting mechanisms. According to the study, awareness campaigns need to be ongoing to cultivate a safety culture. This is supported by Hattingh (2020), who indicates that training programmes alone are not effective without reinforcement.

6.2.4. Policy implementation and monitoring

Although the university observes the Constitution of the Republic of South Africa (1993) and (1977) at the conceptual level, there are limited indications of practical implementation. The monitoring process is not robust, and the safety audit process is not regular. This suggests that

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compliance is more of a response rather than a pre-emptive measure. The study concludes that the creation of a monitoring and evaluation system, backed by data-based reporting, is essential to facilitate compliance. This observation is consistent with the ISO's (2018) framework, which highlights continuous improvement through the Plan-Do-Check-Act cycle.

6.2.5. Organisational culture and resources

The institution's H&S culture is largely reactive, with factors such as financial constraints and departmental cooperation playing a role in shaping it. The study concludes that a positive organisational culture is achieved when there is sufficient resourcing, empowerment, and cooperation between departments. Financial investments in H&S should not be treated as expenditures, but rather as sustainability strategies for the institution. The study has further concluded that H&S in an institution is negatively impacted by apathy on the part of the leadership, poor communication, lack of awareness, and inadequate allocation of resources. The study has highlighted the need to move from reactive compliance to proactive compliance, where H&S are integrated into the values of the institution to improve compliance, reduce risks, and increase the overall health and well-being of the staff and students.

6.3.Recommendations

The findings in this study have clearly indicated that significant improvements are to be made in various aspects of the institution's H&S management system. Firstly, the institution's leadership commitment and accountability must be improved. This is because one major theme that has been identified in all the interview data, surveys, and checklist results is that the institution's H&S responsibilities have been poorly coordinated. This has led to a fragmented safety culture in which safety issues have either been poorly addressed or put off indefinitely. This trend must be changed by elevating H&S to a strategic organisational priority. This must involve executive leaders, deans, and department heads becoming actively involved in H&S inspections, safety briefings, and committee activities. Additionally, these leaders must also show their proactive involvement in H&S by responding to reported hazards. Accountability must also be included in performance evaluations rather than being assumed.

The second recommendation relates to the development and implementation of an extensive and preventive maintenance programme. The checklist findings indicated several recurring hazards at the institution, including expired fire extinguishers, blocked exits, defective

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electrical installations, damaged ceilings, and inadequate ventilation systems. This suggests that the current system of maintaining infrastructures in the institution is reactive and inadequate. Therefore, to remedy this situation, the institution needs to develop an extensive preventive maintenance programme that includes building inspections and developing a system to report any identified defects. Additionally, developing a digital system to track defects and ensure that they are not abandoned in the process would be helpful in improving transparency in the institution. However, without an effective system in place, infrastructural deterioration in the institution will continue to compromise its safety standards.

Improving the quality of H&S training and communication is another important recommendation. The study revealed that only a small proportion of students received training, while the training of the staff was inconsistent. There was also a lack of awareness of emergency procedures, safety roles, and reporting. The institution, therefore, needs to develop a policy on the provision of mandatory training sessions for all staff and students. The training needs to be followed up with refresher courses. The awareness of the entire university community also needs to be improved. The communication can be in the form of email, use of posters, use of technology, residence briefings, and classroom announcements. Effective communication is vital in establishing a common understanding, especially in times of emergencies. The training needs to be assessed and connected to practical examples rather than theory.

This study also recommends the development of a centralised system in monitoring and evaluating H&S. The current system lacks documentation, tracking, and auditing. This creates a disconnect between what is in the policy and what is being done on the ground. This would involve having a system to monitor all the aspects mentioned in the previous paragraph. This would also involve having internal audits to ensure that the policies are not only being implemented but also improved based on the gaps identified. This system should incorporate the PDCA cycle.

In addition, there is a need to strengthen control measures. Controls that were observed during inspections, such as emergency signs, fire control equipment, waste management systems, and ventilation controls, were either not properly maintained or were not properly implemented. To strengthen control measures, the institution will have to establish a standard procedure for testing control measures, supported by adequate evidence such as service tags, checklists, and

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digital records. Controls should not be static features of the built environment. Rather, they should be constantly reviewed to assess their functionality and relevance. The responsibility of each control measure, such as academic buildings, laboratories, cafeterias, or residences, should be clearly assigned to specific departmental units or building custodians

Another suggestion offered by the study is to develop a stronger safety culture within the institution. Compliance with safety regulations cannot be sustained by rules and regulations only; rather, behaviour, attitudes, and values must all promote compliance. This can be achieved by developing a safety culture within the institution by promoting adherence to safety practices and rewarding exemplary behaviour. All staff and students must also identify themselves with safety in order to promote compliance. This can be achieved by enhancing the visibility of safety officers on campus, engaging student leadership structures on safety issues, and incorporating safety themes in events held on campus. This would promote a culture of shared responsibility.

6.4. Contribution of the study

6.4.1. Research gap

This study makes a substantive and multifaceted contribution to the field of OHS within HEIs, particularly in the South African context where empirical evidence remains limited. By integrating quantitative surveys, in-depth interviews and a comprehensive Environmental Health and Safety (EHS) checklist, the study provides one of the few holistic assessments of H&S conditions within university buildings. It does so by examining user perceptions, expert insights, and objective infrastructural assessments simultaneously, thereby offering a richer and more accurate understanding of institutional safety than studies that rely on a single data source. In this regard, the study extends existing scholarship by demonstrating that compliance cannot be meaningfully assessed through perceptions alone, as these often mask deeper infrastructural and governance deficiencies. The convergence and divergence of findings across methods offer a methodological contribution that future researchers can apply in similar settings.

6.4.2. Theoretical contribution

The study also contributes to theory by illustrating the centrality of institutional systems in shaping compliance behaviour. While traditional safety models emphasise awareness and training as precursors to compliance, the findings of this research show that structural and

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organisational factors—including leadership visibility, functional operational controls, maintenance quality, and clear communication channels—are more strongly associated with actual compliance. This shifts the theoretical conversation toward a systems-based interpretation of occupational H&S in HEIs. The regression results and qualitative interviews reinforce that compliance is best understood not as an individual behavioural choice but as an outcome of institutional design, resource allocation and governance structures. This insight advances the application of ISO 45001 principles in university contexts by demonstrating how weaknesses in the Plan–Do–Check–Act cycle, particularly in the "Check" and "Act" phases, directly undermine institutional safety performance.

6.4.3. Practical contribution

In essence, the study offers a diagnostic understanding of the gaps in H&S in the case institution. In this regard, the findings from the checklist are further informed by the interview narratives to point to some of the areas that need immediate attention. In this respect, the study points to some of the gaps in fire safety, emergency preparedness, ventilation systems, electrical systems, waste disposal systems, and signage. In essence, the identification of gaps in H&S in the institution can be attributed to some of the findings in fire safety, emergency preparedness, ventilation systems, electrical systems, waste disposal systems, and signage. In essence, the study offers a credible source of recommendations to the institution to improve its H&S standards.

6.4.4. Policy

Besides its practical and theoretical contributions, the study provides an important policy contribution. By assessing the level to which the institution complies with the Occupational H&S Act and the National Building Regulations, the study points out gaps in the regulatory environment that prevent an institution from complying with these acts. It illustrates where institutional practices deviate from legal obligations and where operational gaps in institutional operations prevent an institution from complying with these acts. Such gaps include irregular inspections, documentation issues, and control problems. Such an assessment can be used in policy review processes at both institutional and governmental levels, particularly in the context of safety governance in public universities. The findings can be used to inform more robust institutional policies and practices in universities to ensure they meet their legal and ethical obligations

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The study is important in the broader discourse on student wellbeing and campus safety, as it reveals the extent to which students are underserved in the current institutional safety systems. The fact that only 22% of the students have had any kind of safety training, while the rest have limited awareness of the procedures, reveals a gap in the current university safety culture. The study is important to higher education practitioners since, despite being the largest user group in buildings, they are the least engaged in the current processes. The study is important in revealing this gap, which is relevant in the emerging discourse on the need to develop student-centred interventions in campus safety and risk communication.

6.5. Limitations of the Study

Although the study provides a comprehensive and multisource assessment of H&S conditions within the selected institution, certain limitations must be acknowledged. A key limitation is the absence of complete student compliance data in the quantitative dataset. Although the survey measured the students' perceptions, awareness, and exposure to training, the compliance measures related to students were incomplete, which reduced the ability to compare compliance behaviors between staff and students. The incomplete compliance measures related to students, therefore, indicate an operational limitation in the institution's safety management processes, where students are not being tracked in terms of compliance measures. As a result, important conclusions regarding student behavioural compliance could not be fully drawn.

Another limitation is related to the basic limitations of self-reported measures, which are often employed in surveys. While surveys offer important insights into perceptions and experiences, they are often subjective and may not necessarily translate to actual behaviors or environmental factors. The research noted a huge gap in moderate self-rated perceptions of safety knowledge and the physical evidence of non-compliance, which was collected from the checklist surveys. Such gaps may have been caused by respondents over- or underestimating their level of knowledge and/or confidence in safety processes, which is common in perception-based research.

While the research employed a single case study, which is common in most research designs, this is a limitation in terms of the study's generalisability. While the characteristics of the

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institution are similar to most higher learning institutions in South Africa, the fact that each university has unique contextual factors, which influence H&S, means that the study's findings should be treated with caution when they are applied to other contexts. Additionally, since the study is cross-sectional, it is limited to a single point in time. As a result, it is impossible to establish improvements or to determine if the noted deficiencies were cyclical or long-term.

Finally, access to some high-risk/controlled operating area spaces during the checklist was limited by scheduling constraints. Although the number of buildings sampled was large, the inability to evaluate all campus structures may have resulted in unrecorded hazards and best practices. However, the depth and breadth of data sources and triangulation across methods ensure that the results of this investigation are reliable in spite of these methodological limitations. Lastly, sampling bias, instrument validation, missing data, observer bias, and the limitations of the statistical analyses were some of the study's limitations

6.6. Areas for Future Research

The results of this investigation present a number of possibilities for future research. One potential area for future investigation is the development of a model to monitor H&S compliance longitudinally. This investigation employed a cross-sectional design; future investigation could longitudinally evaluate whether compliance is rising, static, or falling in response to institutional intervention.

A further potential avenue for research in the future is the extension of the empirical focus from a single institution. A comparative study of several South African universities, or between public and private sector institutions, has the potential to provide a more general understanding of the influence of organisational culture, resource allocation, and commitment on compliance

There is also a need to further investigate student-centred safety behaviour. This is because, in the absence of student compliance variables in the study, there is an opportunity to investigate the safety needs, perceptions, and behaviour of student populations, especially in living settings where exposure is more pronounced.

A further opportunity lies in investigating the role of technology in enhancing H&S management systems. This can be done by evaluating the effectiveness of mobile reporting tools, digital logs, and technology-driven asset tracking, as well as training tools. Future work

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may focus on leadership behaviour and organisational culture in higher education risk management systems.

Given the level of influence leadership has been shown to have in this study, qualitative research into managers' attitudes, decision-making processes, and accountability structures may provide insights into how leadership promotes or impedes compliance.

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APPENDIX A: INFORMATION DOCUMENT/LETTER

Study title: **Assessing the health and safety conditions within the buildings at the institution of higher learning in South Africa: A case in the Free State Province**

Greetings

Introduction:

I, Mojabeng Vinolia Mokgobo, am conducting a research study titled: Assessing the health and safety conditions within the buildings at the institutions of higher learning in South Africa: A case in the Free State Province. The proposed research is to obtain vital information about questions surrounding the above-mentioned topic. In this study, I want to investigate and learn more Health and Safety Compliance within Buildings.

Invitation to participate: We are asking/inviting you to participate in this research study. The study will include students and staff as participants, and there are no foreseeable risks to the participants. Participation is voluntary, and that you may withdraw from the study at any time without any penalties. There are no costs payable by you to participate in the study, and neither will you be remunerated for your participation. It is expected that the study will be conducted for six(6) months, and the expected time you may be engaged by the researcher is 30 minutes. All efforts will be made to keep personal information confidential to ensure anonymity. The results from the study may be presented at seminars/conferences, or be published in a suitable academic journal.

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Contact details of researcher(s) – for further information/reporting of study-related issues, please contact:

…….. ……

Signature of researcher Date

Contact details of Secretariat and Chair: Ethics Committee of the Faculty of Health Sciences, Central University of Technology– for reporting of complaints/problems: Telephone number (051) 507 3911.

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APPENDIX B: CONSENT TO PARTICIPATE IN RESEARCH

PROJECT TITLE: ASSESSING HEALTH AND SAFETY CONDITIONS IN THE BUILDINGS AT AN INSTITUTION OF HIGHER LEARNING IN SOUTH AFRICA: A CASE IN THE FREE STATE PROVICE

You have been asked to participate in a research study and you have studied the information letter about this study.

Kindly note that your ***participation*** in this research is ***voluntary***, and you will not be penalised or lose benefits if you refuse to participate or decide to terminate participation.

If you agree to participate, you will be given a signed copy of this document as well as the information letter, which is a written summary of the research.

You may contact Vinolia Mokgobo on 051 507 3401 at any time if you need some clarity concerning the research study. Alternatively, you may contact the Secretariat of the Ethics Committee of the Faculty of Health Sciences, CUT on 051 507 3911 for any questions about your rights as a research subject.

The research study, including the above information has been verbally described to me. I understand what my involvement in the study means, and I voluntarily agree to participate.



…… ……

Signature of researcher Date

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……	…….
Signature of participant	Date

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APPENDIX C: REQUEST TO CONDUCT THE RESEARCH STUDY

02 Puzzle Bush Street

Wildolive

Bloemfontein

9301

Institutional Planning and Quality Enhancement (IPQE)

20 President Brand St

Bloemfontein Central

Bloemfontein

9301

Dear Dr/Mr/Mrs

RE: REQUEST TO CONDUCT RESEARCH STUDY AT CUT

I, Mojabeng Vinolia Mokgobo, hereby requests permission to conduct a research study at Central University of Technology, Free State. The title of my study is: **Assessing the Health and Safety Conditions within the Buildings at the Institution of Higher Learning in South Africa: A Case in the Free State Province**

The purpose of the study is to necessitate a comprehensive assessment of the structural soundness, fire prevention measures, illumination, air circulation, and general environmental and occupational welfare of educational structures to ascertain adherence to the pertinent regulatory frameworks, particularly the National Building Regulations and Building Standards Act (Republic of South Africa, 1977). The study also aims to comprehensively assess and analyse the prevailing health and safety conditions within the buildings of higher educational institutions in the designated region.

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The study will involve students and staff members as participants, and the expected duration of the study is six (6) months.

Please find a copy of the research proposal that will be submitted to the Health Science Ethics Research Committee (HSREC) at the University of the Free State for ethical approval.

I trust that you will consider the above request favourably.

Yours sincerely



Signature of researcher

Kindly indicate your approval, or not by marking the appropriate box below:

APPROVED ☐ **NOT APPROVED** ☐

…… ……

Signature of Clinical Head/ Date

Head of Department

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APPENDIX D: SEMI-STRUCTURED INTERVIEW GUIDE FOR HEALTH AND SAFETY PROFESSIONALS

Project title: **Assessing the Health and Safety Conditions within the Buildings at the Institutions of Higher Learning in South Africa: A Case in the Free State Province**

Part A: General Information

1. What is your highest education qualification?

Matric	
Post-matric certificate	
National Diploma	
Bachelor's degree	
Postgraduate diploma	
Honours degree	
Master's degree	
Doctoral degree	
Other	

2. What is your total years of experience in H&S environment?

1-5 years	
6-10 years	
11-15 years	
16 years and above	

Part B: Components of Health and Safety for Enhanced Compliance

1. In your opinion, what are the key components of health and safety that should be prioritized in buildings of higher learning institutions?
2. What health and safety aspects are frequently overlooked, but in your view, play a critical role in ensuring full compliance?

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Part C: Occupational Hazards in Higher Learning Institutions

1. Can you describe some of the most common occupational hazards you have observed within the university's buildings?
2. In your experience, which areas within the institution's buildings tend to have a higher occurrence of these hazards?

Part D: Factors Influencing Compliance and Non-Compliance

1. In your experience, which factors motivate staff and students to consistently adhere to health and safety protocols within the university?
2. What specific barriers or challenges do individuals face when trying to comply with health and safety guidelines?

Part E: Effectiveness of the Current Control Measures

1. What is your view on the effectiveness of the current control measures in maintaining health and safety within the university's buildings?

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APPENDIX E1: QUESTIONNAIRE FOR STAFF

Project title: Assessing the Health and Safety Conditions within the Buildings at the Iinstitutions of Higher Learning in South Africa: A Case in the Free State Province

The purpose of this research project is to thoroughly examine the current health and safety conditions within the buildings of higher education institutions in the Free State Province of South Africa. This study aims to identify existing deficiencies and challenges related to health and safety, and to recommend practical solutions that can enhance the safety and well-being of students, staff, and managers; and thereby supporting educational endeavours, and prioritizing safety within these institutions.

Instructions

Kindly complete the questionnaire by adding X next to the appropriate answer and writing the answer on the lines provided.

Section A: Demographic Information

1. **In which faculty/division are you currently working? _____**
2. **Kindly indicate your job title:**

□ Lecturer (academic staff)

□ Administrative staff

□ Technician

□ Other, please specify: _____

Section B: Components of Health and Safety for Enhanced Compliance

5. **How familiar are you with the health and safety protocols of the CUT, Bloemfontein campus?** (1 = Not familiar at all, 5 = Very familiar)

□ 1

□ 2

□ 3

□ 4

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□ 5

6. **How often do you come across clear health and safety signage in the buildings?**

□ Always

□ Every hour

□ Everyday

□ Weekly

□ Never

7. **In your opinion, which aspect of health and safety is the <u>most important</u> in ensuring compliance?** (Only choose one)

□ Clear communication

□ Regular training

□ Visible signage

□ Punitive measures for non-compliance

□ Availability of safety equipment

□ Other, please specify: _____

8. **How often do you often conduct health and safety awareness sessions or workshops?**

□ Annually

□ Semi annually

□ Quarterly

□ Never

□ Not sure

SECTION C: Occupational Hazards in Higher Learning Institutions

9. **Have you ever witnessed or been involved in a health or safety incident within the buildings?**

□ Yes

□ No

10. **If "yes" to the above, where did the incident occur?** (You can choose more than one)

□ Classroom

□ Laboratory

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- Library
- Cafeteria
- Dormitory
- Recreational facility
- Other, please specify: _____

11. **How often are you informed by the CUT about potential hazards in your environment?**

- Immediately
- Monthly
- Quarterly
- Rarely
- Never

12. **Have you ever been trained or informed by the CUT about what to do in the case of specific hazards (like fires, chemical spills, etc.)?**

- Yes
- No
- Partially

SECTION D: Factors Influencing Compliance and Non-Compliance

13. **How confident are you in/of? your knowledge to adhere to the institution's health and safety protocols?**

(1 = Not confident at all, 5 = Very confident)

- 1
- 2
- 3
- 4
- 5

14. **What do you think is the biggest barrier among the students and staff to follow the health and safety guidelines?** (Choose one)

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- Lack of awareness
- Complexity of rules
- Peer influence
- Inadequate enforcement
- Perception that rules are unnecessary
- Other, please specify: _____

SECTION E: Current State of Health and Safety Compliance

15. **Overall, how safe do you feel within the institution's buildings?** (1 = Not safe at all, 5 = Very safe)

- 1
- 2
- 3
- 4
- 5

16. **Are there specific places within the institution where you feel more at risk regarding health and safety?**

- Yes
- No

16.1 If yes, please specify: _____

17. **How would you rate the institution's efforts in communicating health and safety protocols to students?** (1 = Very poor, 5 = Excellent)

- 1
- 2
- 3
- 4
- 5

SECTION F: Effectiveness of Current Control Measures

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18. **How effective do you find the CUT's current health and safety control measures in place?**

(1 = Not effective at all, 5 = Very effective)

- 1
- 2
- 3
- 4
- 5

19. **Are there any control measures that you believe should be added or modified to improve safety at the CUT?**

- Yes
- No

19.1 If yes, please specify:----------

20. **Do you feel there are enough emergency exits, fire extinguishers, and other safety equipment in the institution's buildings?**

- Yes
- No
- Not sure

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APPENDIX E2: QUESTIONNAIRE FOR STUDENTS

Project title: Assessing the Health and Safety Conditions within the Buildings at the Institutions of Higher Learning in South Africa: A Case in the Free State Province

The purpose of this research project is to thoroughly examine the current health and safety conditions within the buildings of central university of technology in the Free State Province of South Africa. This study aims to identify existing deficiencies and challenges related to health and safety, and to recommend practical solutions that can enhance the safety and well-being of students, staff, and managers, thereby supporting educational endeavours and prioritizing safety within these institutions.

Instructions

Kindly complete the questionnaire by adding X next to the appropriate answer and writing the answer on the lines provided.

Section A: Demographic information

1. What is your current level of study?

- Undergraduate
- Postgraduate

Objective 1: Components of Health and Safety for Enhanced Compliance

5. **How familiar are you with the health and safety protocols of the institution?** (1 = Not familiar at all, 5 = Very familiar)

- 1
- 2
- 3
- 4
- 5

6. **How often do you come across clear health and safety signage in the institution's buildings?**

- Always

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- Often
- Sometimes
- Rarely
- Never

7. **In your opinion, which aspect of health and safety is the most important in ensuring compliance?** (Choose one)

- Clear communication
- Regular training
- Visible signage
- Punitive measures for non-compliance
- Availability of safety equipment
- Other: _____

8. **How often does the institution conduct health and safety awareness sessions or workshops?**

- Regularly
- Occasionally
- Rarely
- Never
- Not sure

Objective 2: Occupational Hazards in Higher Learning Institutions

11. **Have you ever witnessed or been involved in a health or safety incident within the institution's buildings?**

- Yes
- No

12. **If "yes" to the above, where did the incident occur?** (You can choose more than one)

- Classroom
- Laboratory
- Library
- Cafeteria

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- Dormitory
- Recreational facility
- Other: _____

12. **How often are you informed about potential hazards in your environment by the institution?**

- Immediately
- Monthly
- Quarterly
- Never

13. **Are you trained or informed about what to do in the case of specific hazards (like fires, chemical spills, etc.)?**

- Yes
- No
- Partially

Objective 3: Factors Influencing Compliance and Non-Compliance

14. **How confident are you in/of? your knowledge to adhere to the institution's health and safety protocols?**

(1 = Not confident at all, 5 = Very confident)

- 1
- 2
- 3
- 4
- 5

15. **If you are a student, what do you think is the biggest barrier among the students to follow the health and safety guidelines?** (Choose one)

- Lack of awareness
- Complexity of rules
- Peer influence

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- Inadequate enforcement
- Perception that rules are unnecessary
- Other: _____

Objective 4: Current State of Health and Safety Compliance

16. **Overall, how safe do you feel within your institution's buildings?** (1 = Not safe at all, 5 = Very safe)

- 1
- 2
- 3
- 4
- 5

17. **Are there specific places within the institution where you feel more at risk regarding health and safety?**

- Yes
- No

If yes, please specify: _____

18. **How would you rate the institution's efforts in communicating health and safety protocols to students?** (1 = Very poor, 5 = Excellent)

- 1
- 2
- 3
- 4
- 5

Objective 5: Effectiveness of Current Control Measures

19. **How effective do you find the current health and safety control measures in place?** (1 = Not effective at all, 5 = Very effective)

- 1
- 2

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□ 3

□ 4

□ 5

20. **Are there any control measures that you believe should be added or modified to improve safety?**

□ Yes

□ No

If yes, please specify: _____

21. **Do you feel there are enough emergency exits, fire extinguishers, and other safety equipment in the institution's buildings?**

□ Yes

□ No

□ Not sure

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APPENDIX F: CHECKLIST FOR AUDIT

ENVIRONMENTAL, HEALTH, AND SAFETY (EHS) AUDIT CHECKLIST

Inspector:_____ **Building:**_____ **Date: / /2024**

AISLES/EXITS/EGRESS		**YES**	**NO**	**N/A**
1	Minimum width of any aisle leading to an exit is at least 44 inches wide.			
2	Are exits marked, free of debris and readily accessible at all times?			
3	Is emergency lighting operating? (Test by using test button if you can do so from the ground or floor.)			
4	Can you see marked exits or exit signs from the aisles in your area?			
5	Are aisles and doorways kept clear, and free of obstructions with trip hazards minimized to permit visibility and movement?			
6	Are doors not used for egress (closets, offices, etc.) that could incorrectly be thought to be an exit labelled "NOT AN EXIT?"			
7	Are floor surfaces clean, dry, level, not slippery or sticky and in good condition?			
COMPRESSED GAS CYLINDERS		**YES**	**NO**	**N/A**
8	Are cylinders legibly marked to clearly identify the gas contained?			
9	Are cylinders stored away from heat sources and do they have separation between flammables and oxidizers?			
10	Are cylinders located or stored in a manner to prevent them from creating a hazard by tripping, falling, or rolling? The cylinders should be stored upright and chained with protective cap in place (including empty containers).			
11	Are valve protector caps placed on cylinders when not in use?			
12	Are flammables and combustibles stored properly?			
EMERGENCY, HEALTH, AND SAFETY INFORMATION		**YES**	**NO**	**N/A**
13	Are area hazard signs visible, legible, understandable and in compliance with regulations?			

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<table>
<tr><td>14</td><td>Are procedures established for alerting employees of an emergency in the workplace (i.e., fire and shelter)?</td><td></td><td></td><td></td></tr>
<tr><td>15</td><td>Are fire alarm pull station locations marked and unobstructed?</td><td></td><td></td><td></td></tr>
<tr><td>16</td><td>Are sign for emergency numbers, routes, and evacuation plans posted?</td><td></td><td></td><td></td></tr>
<tr><td>17</td><td>Are the Evacuation Coordinators and PI/Safety Designates assigned?</td><td></td><td></td><td></td></tr>
<tr><td>18</td><td>Do employees know who their Evacuation Coordinators and PI/Safety Designates are?
<table>
<tr><th>Evacuation Coordinator</th><th>Emergency Number</th><th>Alternate Number</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>
<table>
<tr><th>PI/Safety Designate(s)</th><th>Emergency Number</th></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table></td><td></td><td></td><td></td></tr>
<tr><td>19</td><td>Does the Evacuation Coordinators have their numbers readily available, functional?</td><td></td><td></td><td></td></tr>
<tr><td>20</td><td>Is a copy of the Emergency Action Plan (EAP) for the area available for employees to read?</td><td></td><td></td><td></td></tr>
<tr><td>21</td><td>Are employees trained on emergency procedures (primary and secondary routes)? Do they know where to go?</td><td></td><td></td><td></td></tr>
<tr><td>22</td><td>Does the EAP include a way to alert employees, including disabled workers, to evacuate or take other action and include instructions on how to report emergencies?</td><td></td><td></td><td></td></tr>
</table>

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GENERAL FACILITY

FIRE EMERGENCY		YES	NO	N/A
23	Are fire extinguishers fully charged and have current inspection dates? All previous months should be signed off.			
24	Are fire extinguishers and hoses mounted, visible, and accessible?			
25	Do employees know where the fire extinguishers are and how to use them?			
26	Do fire doors and shutters appear to be in good operating condition?			
FIRE PREVENTION		**YES**	**NO**	**N/A**
27	Is there a minimum 24 inches clearance between storage and sprinkler heads?			
28	Are "NO SMOKING" areas enforced?			
39	Are electrical outlets or cords not overloaded? Only allowable number of connections (i.e., a 4-way outlet only has 4 pieces of equipment connected and not loaded with additional extension cords). NOTE: Isolated power not included.			
30	Are fire sprinkler heads unobstructed and free of dirt and corrosion?			
FLAMMABLES/COMBUSTIBLES		**YES**	**NO**	**N/A**
31	Are hazardous materials properly stored?			
32	Are chemicals properly stored and returned to appropriate cabinet at end of shift?			
33	Are safety cans in good condition (no corrosion, damage, etc.) with flame arrestor in place?			
34	Are flammable cabinets grounded and containers bonded when dispensing flammable liquids? Only cabinets from which flammable liquids are dispensed need to be grounded.			
35	Are flammable liquids stored in approved safety containers?			
36	Are materials that could burn kept away from ignition sources?			
37	Is area free of excessive trash or combustibles?			

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38	Do all can with red lids have fusible links?			
39	Are the tops of the flammable cabinets clear (nothing stored on top)?			
40	Are all flammable bottle tips unmodified and/or undamaged?			
41	Are backflow valves working in all flammable bottles?			
42	Is heat producing equipment turned off at night when no one is present?			
HOUSEKEEPING/WORK ENVIRONMENT		**YES**	**NO**	**N/A**
43	Are desk/work and storage areas clean, organized, and sanitary?			
44	Are trash containers (large 55 gallon) covered?			
45	Are electrical/network cables organized to eliminate trip hazards?			
46	Are drawers of desks and file cabinets kept closed when not in use?			
47	Are file cabinets arranged so drawers do not open into aisles?			
48	Is only one file drawer opened at a time?			
49	Is knife blade on paper cutter lowered and latched when not in use?			
50	Are mezzanines labelled with floor load capacity?			
51	Is all lighting lit and/or appear adequate for the task performed?			
52	Are floor openings covered and secure?			
53	Are spilled or dropped items cleaned up and put away?			
54	Are guardrails installed where required? (Guardrails are required where there is over 48 inches to next lower level.)			
SECURITY ITEMS		**YES**	**NO**	**N/A**
55	Do employees have proper ID badges?			
56	Do contractors/vendors have proper ID badges?			
57	Are visitors escorted and have proper ID badges?			
58	Are employees, contractors, and visitors displaying their ID badges above the waist and on an outer garment?			
59	Are doors that should be secure not being propped open?			

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GENERAL FACILITY

STRUCTURES		YES	NO	N/A
60	Are ceiling tiles not damaged, loose, or missing?			
61	Have all overhead hazards been identified?			

ENVIRONMENTAL

CLEAN AIR ACT COMPLIANCE		YES	NO	N/A
62	Are any solvent contaminated rags lying about in the work area?			
63	Are solvent-contaminated rags properly disposed of?			
64	Have all open top solvent pump cans been removed from the work area?			
65	Are containers, solvent dispensing containers, paint gun cleaning containers, and solvent dispensing bottles closed when not in use?			
CLEAN WATER ACT COMPLIANCE		**YES**	**NO**	**N/A**
66	Do employees not dump wastes into drains or sinks unless authorized (including wash water and mop water)?			
67	No wastes dumped outside or in storm sewers or catch basins?			
68	Are pipes, pumps, hoses, and valves free of leaks or defects?			
69	Do sumps, pits, lift station containment valves remain dry?			
70	Are spills and leaks attended to and reported when required?			
HAZARDOUS/NON-HAZARDOUS WASTE COMPLIANCE		**YES**	**NO**	**N/A**
71	Are hazardous waste containers properly identified and labelled with the words, "HAZARDOUS WASTE?"			
72	Are used oil collection containers properly identified and clearly labelled with the words, "USED OIL?"			

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73	Are controlled and non-hazardous wastes being collected and managed properly (i.e., returnable towels, coolant sludge, composite waste, fluorescent lamps)? Are containers properly identified and clearly labelled with contents?			
74	Are hazardous waste collection containers fully closed while not in use? Lids that "spring up" are not fully closed.			
75	Are used oil waste containers closed while not in use?			
76	Are trash cans free of hazardous waste?			
77	Are trash cans free of scrap metal?			
78	Is there less than 55 gallons per waste stream at satellite accumulation area(s)?			
79	Are hazardous waste satellite accumulation area signs in place?			
80	Are employees familiar with the waste materials generated in the work area and the proper disposal method(s)?			
81	Are proper absorbent materials on hand for spills?			
82	Is waste removed in a timely manner?			

SAFETY

EMPLOYEE WORK PRACTICES		**YES**	**NO**	**N/A**
83	Is long hair tied back when around machinery? (Hair that touches shoulder must be tied back.) (Apron strings and non-breakaway badge lanyards, etc., should also be secure in some manner.)			
84	**Is Job Safety Analysis (JSA) information available for employee reference for infrequently performed tasks and high value or high-risk tasks?**			
ELECTRICAL EQUIPMENT MARKINGS		**Yes**	**NO**	**N/A**
85	Do circuit breakers clearly indicate whether they are in the "ON" or "OFF" position and are switch panels clearly marked?			

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86	Is electrical panel access clear – 36 inches clearance in front of panel?			
87	Is equipment intended for long-term use hard wired into permanent facility wiring?			
ELECTRICL GROUNDING		**YES**	**NO**	**N/A**
88	Are electrical appliances, portable electrical tools, and fixed electrical equipment grounded or UL rated/double insulated and in good repair?			
89	Do extension cords being used have a grounding conductor and are they in good repair?			
90	Are extension cords used only for temporary wiring applications (60 days max.)?			
EQUIPMENT		**YES**	**NO**	**N/A**
91	Are there any proper guarding of any pinch points, rotating collars, cams, chucks, couplings, shafts flywheels, spindles, bolt ends, rotating mechanisms, etc.?			
92	Are all protective guards (including light curtains and interlocks) in place, effective, and checked daily or before use?			
93	Are all controls and emergency stops clearly identified and within reach of operator?			
94	Are all emergency stops, safety guards, and safety devices located on equipment and tools working and adjusted properly?			
95	Are grinder gaps 1/8 inch from bottom of wheel and 1/4 inch from top of wheel?			
96	Grinding wheel surface not damaged or worn (must be square and no grinding on side of wheel).			
97	No aluminium found in grinding wheel surface?			
98	Are fans inspected annually for damage (cracked blades, guards, cords, etc.)?			
99	Are heat lamp and work light bulbs guarded?			

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100	Are all fixed machines bolted to the floor?			
101	Do air nozzles have relief valves to decrease pressure to 29 psi or lower?			
102	Are air disconnects and safety nozzles the correct type (safety relief vents may not be covered or sealed in any way)?			
103	Air lines and hydraulic lines free of damage?			
ERGONOMICS		**YES**	**NO**	**N/A**
104	Ergonomic problems observed with workstation, keyboard, posture, or work habits.			
105	Employees are advised on the proper lifting techniques.			
106	Are mechanical lifting aids available for heavy or awkward items?			
EYEWASH STATION		**YES**	**NO**	**N/A**
107	Eyewash station is clean and tested.			
108	Eyewash station is located in a way that assures free and unimpeded access.			
FORKLIFT/INDUSTRIAL TRUCKS – DAILY INSPECTION		**YES**	**NO**	**N/A**
109	Is a daily inspection performed prior to first use and log entry completed?.			
110	Do all operators have current qualification?			
111	Are service valves closed on all propane equipment left inside overnight?			
112	Harness and lanyard used at all times with scissor-lift/Hi-Bob, aerial platform, etc.?			
113	Load capacity labelled. Is the load capacity labelled?			
114	Are vehicles driven backwards with awkward or bulky loads?			
115	Are all traffic signs observed? (Operators must stop at stop signs.)			
116	Are pedestrians given the right-of-way?			
117	Are safety glasses and seatbelt worn while operating the truck?			
HAZARD COMMUNICATION – CHEMICAL SAFETY		**YES**	**NO**	**N/A**

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118	Do employees know what an MSDS (Material Safety Data Sheet) is, where to find them, and how to use them?			
119	Is each container of hazardous chemicals in the work area properly labelled by identifying the chemical it contains and marked with health hazards?			
120	Are all chemicals that are used in the facility listed in the MSDS book and available?			
121	Is food separated and away from chemicals in the work area?			
HOIST/CRANES/LIFTING DEVICES		**YES**	**NO**	**N/A**
122	Are all slings, hoists, chains, jacks, and supports certified and tagged with load limits and inspection dates?			
123	Is the weight of all loads known and is the crane (user) inspected before use?			
124	Is there a full, unrestricted view for operator before lifting load?			
125	Are all loads being lifted overhead secured?			
126	Is there no one beneath the load while it is suspended?			
127	Does the crane operator have a current license or certificate?			
LADDERS/SCAFFOLDING		**YES**	**NO**	**N/A**
128	Are all step ladders under 20 feet in length?			
129	Are rubber feet on ladders in good repair?			
130	Are all ladders in good condition with no structural damage?			
131	Are there no metal or aluminium ladders in electrical areas?			
132	Are ladders being used properly (only one person on ladder at a time and no one standing above the second step down from the top)?			
133	Are fixed stairs being used (instead of ladders) where regular travel is needed?			

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PERSONAL PROTECTION EQUIPMENT (PPE): EYE AND FACE/RESPIRATORY/HEARING		YES	NO	N/A
134	Are areas clearly marked as a "HEARING CONSERVATION" area, as needed?			
135	Are approved safety glasses, face shields, gloves, palm guards, aprons, clothing, and hearing protection used in required areas?			
136	Are employees using appropriate respirators for the work being done?			
137	Are respirators clean and stored properly?			
138	Are employees using respirators clean-shaven (so mask will seal against face)?			
139	Are employees using paper respirators (paper masks) and trained in their proper use?			
PPE: FALL PROTECTION		**YES**	**NO**	**N/A**
140	Is appropriate fall protection provided and used properly (safety harness, lanyard, and if needed, self-retracting lifeline)?			
141	Is fall protection PPE stored properly, kept clean, and out of direct sunlight?			
142	Is fall protection PPE inspected and certified annually?			
WALKING SURFACES/STAIRS		**YES**	**NO**	**N/A**
143	Are all floor tracks covered or covered as much as possible when in use?			
144	Is the angle of fixed stairs within 30 to 50 degrees?			
145	Are non-slip surfaces in a good condition on steps and platforms?			
146	Are stairwells clear and handrails in a good condition?			
147	Are mobile work platforms available and used?			

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UNSATISFACTORY EHS CONDITIONS FOR _____.

ITEM NO.	DEFICIENCY NOTED	CORRECTIVE ACTION

Date: _____ **Signature:** _____

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APPENDIX G: LETTER FROM THE STATISTICIAN

Maryn Viljoen
Statistics Consulting Services

082 823 5731
maryn.viljoen1@gmail.com

Protocol & research methodology consultation | Ethical consultation | Database construction & capturing of data
Analysing data using statistical software packages (SAS Version 9.2) | Statistics consultation services to analyse and interpret data
Conveys results with statistical tables & figures where needed

23 October 2024

To whom it may concern,

Title: "ASSESSING HEALTH AND SAFETY CONDITIONS IN THE BUILDINGS AT AN INSTITUTION OF HIGHER LEARNING IN SOUTH AFRICA: A CASE IN THE FREE STATE PROVINCE.

Researcher: Mojabeng Vinolia Mokgobo
Faculty of Health and Environmental Sciences
Central University of Technology, Free State
Bloemfontein

I have seen and read through this protocol. I gave input and recommendations and will be the biostatistician responsible for the analysis of the data.

Maryn Viljoen
M.Sc. Risk Analysis (UFS)
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APPENDIX H: ETHICAL CLEARANCE LETTER

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

UFS HEALTH SCIENCES

Health Sciences Research Ethics Committee

19-Feb-2025

Dear **Dr France Raphela**

Ethics Clearance: **ASSESSING HEALTH AND SAFETY CONDITIONS IN THE BUILDINGS AT AN INSTITUTION OF HIGHER LEARNING IN SOUTH AFRICA: A CASE IN THE FREE STATE PROVINCE**

Principal Investigator: **Ms Mojabeng Mokgobo**

Department: **CUT - Central University of Technology**

Submission Page

APPLICATION APPROVED

Please ensure that you read the whole document

With reference to your application for ethical clearance with the Faculty of Health Sciences, I am pleased to inform you on behalf of the Health Sciences Research Ethics Committee that you have been granted ethical clearance for your project.

Your ethical clearance number, to be used in all correspondence is:**UFS-HSD2024/2525/2502**

The ethical clearance number is valid for research conducted for one year from issuance. Should you require more time to complete this research, please apply for an extension.

We request that any changes that may take place during the course of your research project be submitted to the HSREC for approval to ensure we are kept up to date with your progress and any ethical implications that may arise. This includes any serious adverse events and/or termination of the study.

A progress report should be submitted within one year of approval, and annually for long term studies. A final report should be submitted at the completion of the study.

Research conducted in any Department of Health facility: Researchers are required to sign and return the HSREC approval letters to the provincial Department of Health where they applied. It is also a requirement for researchers to submit electronic copies of their final research findings, and/or make a presentation of their findings and recommendations at departmental research days when and where indicated.

The HSREC functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act. No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2020); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; International Council for Harmonisation (ICH) Harmonised Guideline, Integrated Addendum to ICH E6(R1), Guideline for Good Clinical Practice (GCP) E6(R2), 2016, SAHPRA Guidelines as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the HSREC of the Faculty of Health Sciences.

The Principal Investigator (PI) bears final responsibility for the RIMS application. In the event of any misconduct or improper activities perpetuated by a third party, the PI will be held vicariously liable. The HSREC will bear no responsibility or liability for any actions of a PI and/or third party or breach of confidentiality caused by the PI and/or third party.

For any questions or concerns, please feel free to contact HSREC Administration: 051-4012650/9860 or email EthicsFHS@ufs.ac.za.

Thank you for submitting this proposal for ethical clearance and we wish you every success with your research.

Yours Sincerely

Dr. C. Armour (Barrett)
Chairperson: Health Sciences Research Ethics Committee

Health Sciences Research Ethics Committee
T: +27 (0)51 401 2650/9860 | E: ethicsfhs@ufs.ac.za
IRB 00011992; REC 230408-011; IORG 0010096; FWA 00027947

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APPENDIX I: PERMISSION LETTER

INSTITUTIONAL PLANNING AND QUALITY ENHANCEMENT

VM MOKGOBO

PERMISSION FOR VINOLIA MOJABENG MOKGOBO TO CONDUCT HER RESEARCH AT CUT ENTITLED "ASSESSING HEALTH AND SAFETY CONDITIONS IN THE BUILDINGS AT AN INSTITUTION OF HIGHER LEARNING IN SOUTH AFRICA: A CASE IN THE FREE STATE PROVINCE."

Dear Ms Mokgobo

This is to confirm that you have been granted permission to conduct research at the central university of technology for your masters project entitled "assessing health and safety conditions in the buildings at an institution of higher learning in south africa: a case in the free state province."

The conditions of the conditional permission are:

- The research will not interrupt any of the official activities at The Central University of Technology.
- You will supply us with the copy of your report.
- The cost of all related activities will be covered by yourself.
- Recruitment of participants is the sole responsibility of yourself.
- The voluntary nature of the potential participants decision to consent to participate should be strictly observed.
- You should not disclose a potential participant's decision to participate or otherwise to any other party.
- Permission does not compel, in any sense, participation of staff members or students in your research.

Senior Director: Institutional Planning and Quality Enhancement

Mr. I Mokhele

04/02/2025

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APPENDIX J: LETTER FROM LANGUAGE EDITOR

Language Editing Services

8 Weymouth Place

Beethoven Avenue

Walmer Heights

Port Elizabeth

6070

Mobile: 083 415 4570

E-mail: renvandm@gmail.com

Renée van der Merwe

BA Hons (Applied Linguistics)

SATI Accredited (1998)

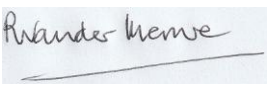
30 April 2026

Dear Dr Raphela

This serves to confirm that the dissertation "Assessing Health and Safety Conditions in the Buildings at an Institution of Higher Learning in South Africa: A case in the Free State Province" by M.V. Mokgobo has been submitted to me for language editing.

While I have suggested various changes, I cannot guarantee that these have been implemented nor can I take responsibility for any other subsequent changes or additions that may have been made.

Yours faithfully



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