



**FRAMEWORK TO IMPROVE THE SAFETY OF UNIVERSITY STUDENT HOUSING  
FACILITIES IN THE WESTERN CAPE PROVINCE, SOUTH AFRICA**

**By**

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## DECLARATION

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Signed

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Date

## ABSTRACT

In the recent time, knowledge of Facility Management (FM) has been found useful in academic settings. FM principles are now applied to ensure the appropriate management of facilities. FM can be applied to all forms of facilities, including educational facilities such as student housing facilities (SHFs). The provision of a safe SHF is very important as shelters form a significant part of man's environment, including in higher learning institutions. However, studies reveal that safety and security measures are not given the necessary attention in tertiary institutions – particularly SHFs. The consequences of neglecting the aspect of safety and security in universities in South Africa has exposed students to several risks and hazards such as increase rate of accidents, theft, fire outbreaks, sexual harassment, and fatalities on campuses. Thus, the need to consider safety and security issues in the management of SHFs in universities in South Africa is paramount. This research aims to develop a framework to improve the safety of university SHFs in the Western Cape Province, South Africa.

A mixed research method was used for the study. A case study approach was adopted where two universities were selected. Interviews, questionnaire surveys and observation were used to collect the primary data. A total of 460 questionnaires were administered to students living in on-campus SHFs which directly belong to the universities. Only 400 questionnaires were returned from both universities. However, 62 of the returned questionnaires were not fully completed. In essence, a total of 338 questionnaires were properly completed. Statistics package SPSS version 25 was used to execute the analysis of the data collected, where both descriptive and inferential statistics were carefully implemented to analyse the data collected accordingly. Observations were also carried out to validate the results. The reliability of the variables and the scale questions were tested with Cronbach's alpha coefficient.

The major findings are centered on the provision and level of importance of security measures, fire safety measures, traffic safety measures, building safety measures and general safety measures in the SHFs. In addition, the findings include the risk associated with the absence of these measures, as well as students' satisfaction level with the performance of the above-mentioned measures in the on-campus university SHFs. The findings indicated a significant difference in the level of provision of security measures and fire safety measures between the two universities. Similarly, a significant difference exists in students' satisfaction level with performance/functionality of different safety and security measures provided in the on-campus SHFs between the two universities. The mean score (MS) differences between the security measures and fire safety measures are quite high, whilst the MS differences between traffic safety measures, building safety measures, and general safety measures are comparatively low. The major issues of concern at university A were; non-functionality of the CCTV, lack of weapon detectors, lack of access control with functional smart card in some residences and inadequate provision of light at night. The lapses at university B include; lack of weapon detectors, inadequate provision of CCTV in the SHFs and around the campus and lack of access control with functional smart card in some residences. Issues of concern across both universities are; inadequate provision/non-functionality of the CCTV, lack of weapon detectors, and absence of electronic coded locks on the doors at the hostels. The findings further revealed that students across both universities ranked all the variables/measures adopted in this study as important and/or extremely important in the SHFs. Likewise, the majority of students across both universities acknowledged that the absence of these measures poses a very high risk to their safety in the on-campus SHFs. Thus, this indicates the need to ensure the appropriate management of the security and safety measures of the on-campus SHFs across both universities. It is essential because peaceful living and effective learning can only take place in a safe and secured environment. The scope of the study is limited to 2 universities in the Western Cape Province of South Africa.

**Keywords:** University, Safety, Security, Students, Perceptions, and Student housing facilities.

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## DEFINITION OF TERMS

Buildings	Buildings are structures enclosing a space and comprises roofs, walls, floors, windows and doors and other components (Aibor and Olorunda, 2006: 203).
Environment	Morina and Morgado (2018: 2) explained environment as all external factors that tends to influence man's life and property.
Facility	Any permanent, semi-permanent, or temporary commercial or industrial property such as building, plant, or structure built, established, or installed for the performance of one or more specific activities or functions (Ogbeifun, 2011: 30).
Facility management	The International Facility Management Association (2017: 4) defines facility management as a profession that encompasses multiple disciplines to ensure functionality, comfort and safety of the built environment by integrating people, place, process and technology.
Health	The World Health Organization (1948: 2) defined health as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.
Safety	Bottani, Monica and Vignali (2009: 155) defined safety as a state in which hazards and conditions leading to physical, psychological or mental harm are controlled in order to preserve the health and well-being of an individual and the community.
Security	Security simply means the measures put in place to protect and safeguard an individual in the workplace in the face of threats from known and unknown sources (Atkin and Brooks, 2015: 93).
Tertiary Institution	An academic institution that provides education beyond high school which includes universities, colleges, graduate and professional schools (Department of Higher Education and Training, 2011:8).



## LIST OF ABBREVIATIONS

FM	Facilities Management
MS	Mean Score
RCD	Risk and Compliance Department
SA	South Africa
SHE	Safety Health and Environment
SHFs	Student Housing Facilities
SPSS	Statistical Package for Social Science
UHC	University House Committee

# CHAPTER ONE

## 1. Introduction

Tertiary education is an essential medium of acquiring skills and knowledge; it has a great influence on the life of every individual in a society (Bloom, Canning, Chan and Luca, 2014: 2). The importance of higher education goes beyond the individual, extending to the family, the community, the country and the world at large (Simpeh, 2018: 1). In consequence, tertiary education brings positive changes to the social and economic development of any nation (Entwistle and Tait, 1990: 172). Nutt (2000: 124) described tertiary institutions as a social system that has both input and output cycle. The inputs of schools comprise human, facilities, financial and material resources. Human inputs consist of students, school administration and academic staff, while the facilities include buildings, roads and grounds, furniture and general infrastructure (Dufur, Parcel and Troutman, 2013: 2; Cole, 2014: 836). All of these inputs are transformed to produce the desired results – students and research outputs (Morina and Morgado, 2018: 17). It is well acknowledged that the most important resource in an academic setting are people (Sahney, Banwet and Karunes, 2004: 149). The people are, however, very much influenced by the facilities. In fact, Price, Matzdorf, Smith, and Agahi (2003: 212) clarified that facilities have a great influence on the students and staff in an academic environment. Similarly, Uline and Tschannen-Moran (2008: 56) and Kok, Mobach and Omta (2011: 250) also indicated that the facilities and environmental factors of tertiary institutions can promote the health of students and subsequently improve their learning experience. Thus, a conducive learning environment is created when the facilities and humans of institutions are well taken care of (Maxwell, 2016: 206).

Facility management (FM) is generally applied to ensure the appropriate management of facilities. Atkin and Brooks (2015: 5) held that the principles of FM can be applied to all forms of facilities, including educational facilities. The knowledge of FM creates an opportunity for not only the proper design of educational facilities e.g. buildings, but also the provision of adequate learning space as well as the safety of students at their various campus residences (Nutt, 2000: 124; and Ling, Chai and Piew 2010: 25). Health, safety, security and environment (HSSE) are integral components of FM (Atkin and Brooks, 2015: 85).

Matzopoulos, Niekerk, Marais and Donson (2002: 242) pointed out that safety and security have become a major challenge in student housing facilities (SHFs) in South Africa. Thus, the need to consider safety, security and environment issues in the management of SHFs in South Africa is paramount. It is crucial because, institutions with adequate and safe SHFs have clear positive consequences on student activities, their health as well as their academic

performance (Hassanain, 2008: 212). According to Zotorvie (2017: 290), SHFs are now perceived as a fundamental component of university physical infrastructure where students live, study and interact with one another. Adewumi, Omirin, Famuyiwa and Farinloye (2011: 150) held that a safe SHF influences positive behaviour among students, enhances safety and comfort, promotes performance and satisfaction, improves healthy living, stimulate academic intellectual development, encourages mutual interaction among students and makes them feel secure in their residences.

### **1.1 Background to problem**

Safety and security management of tertiary institutions have become a global concern (Hollis, 2010: 3). Selikoff and Lee (1978: 549) advocated the safe management of facilities and human resources of/in an institutional environment. According to Prinsloo (2005: 6), universities and other public institutions are expected to be committed to safety and security in the areas of infrastructure management, emergency preparedness, crime prevention, transportation services, and health education. Eisenberg, Gollust, Golberstein and Hefner (2007: 534) state that students may be more at risk at some universities than others, because of differences in the way institutions consider the safety and well-being of their students. Gopal and Niekerk (2018: 172) pointed out that safety and security of learners in the management of tertiary institutions play a major role in the academic achievement of students. In fact, effective teaching and learning cannot take place in an unsafe environment where university occupants are exposed to disaster, violence act, and threat (Callan, 2010: 59). According to Seedat, Niekerk, Jewkes, Suffla and Ratele (2009: 101), effective implementation of health and safety policies and provision of a safe environment is vital for ensuring a conducive learning environment. Atkin and Brooks (2015: 85) suggested that a university is less likely to fulfil its obligations successfully and effectively in teaching, learning, and research if it only focuses on the maintenance of university facilities but fails to prioritise staff and student safety, security, and well-being. Meyer (2017: 3) also stressed the need for adequate safety measures in an academic environment. It can be inferred from the preceding that the safety and security aspects of university campus are crucial.

Notwithstanding, studies show that safety and security is not given the necessary attention in SHFs globally (Lubis and Fauzi, 2019: 5). According to Rodriguez, Kramer and Sherriff (2013: 40), the situation has arisen in tertiary institutions in South Africa, where facility managers and institution management ignore the role of safety and security in the management of institution infrastructure e.g. SHF. Furthermore, approaches to safety, security and environment considerations are fragmented, and there is a lack of consistency in the range and quality of university security services (Agyekum, Ayarkwa and Amoah, 2016: 2107). Sokolow, Lewis,

Keller and Daly, (2007: 319) explained that the lapses in the issue of safety and security in the management of tertiary institution infrastructure in South Africa has led to an increased number of murder cases in student housing, fire outbreak, accident report, theft, poor lighting condition at night, sexual harassment and assaults on university campuses. Rodriguez *et al.* (2013: 41) and Sanni-Anibire and Hassanain (2015b: 230) commented that fire and electrocution incidents are also key risk factors in South Africa SHFs, with 93 fire incidents recorded in 2009 at educational institutions nationwide in South Africa, with 8% of these fires occurring as a result of faulty extension cords, open flames and smoking materials such as cigarettes. Similarly, Jackson, Wilson, Akoto, Dixon, Jacobs, and Ballesteros, (2010: 544) pointed out that the Potchefstroom College of Agriculture reported numbers of critical fire hazards and electrocution risks within the student hostel and kitchen which were aggravated due to lack of sufficient emergency exits.

Although, learning environments ought to be amongst the safest and most secure places, media reports suggest that the situation is different in some developing countries, particularly in South Africa with headlines like: 'School head gunned down' (Xaba, 2006: 569); 'Thugs target institutions' (Luhanga, 2017: 1); 'Violence at schools the order of the day' (Cape Argus, 2016); 'Teacher shot, learner held hostage at Kasi school' (Daily Sun, 2017). Lungani (2018: 2), pointed at another safety and security gap in the management of institution infrastructure as another murder was announced on 19, May 2008, when a student was reportedly strangled in her residence room. According to Lungani (2018: 2), South African tertiary institutions are becoming more dangerous due to safety and security fissures in student housing, with another incident recorded on 1 May 2018 at a particular university in Durban when a first year quantity surveying student was murdered in an undergraduate residence. All this campus violence and these criminal acts call for urgent safety and security attention in the learning environment. Mji and Makgato (2006: 254) are of the opinion that safety and security should be prioritised in the educational environment and attention should be given to university buildings, access to the university environment, and campus facilities including SHFs. A survey carried out in KwaZulu-Natal Province revealed that safety is lacking in the facilities of many public and private organisations, and that buildings were not adequately equipped with safety equipment to protect lives and facilities (Ngulube and Magazi, 2013: 186). Rodriguez *et al.*, (2013: 45) indicated in their investigation that many students and staff in SA tertiary institutions feel unsafe at their respective citadels of learning.

Similarly, Saferspace (2019: 1) commented that South Africa has developed a reputation for being an unsafe place both on campus and outside of the learning environment, with exceptionally high levels of violence and crime. Check (2019: 3) observed that South Africa also has the highest level of recorded robbery with 149.4 incidents recorded per 100,000 of

the population both in the campus residence and off campus accommodation. Additionally, the crime statistics released by South African Police Service on 24 October 2017 state that South Africa has an exceptionally high level of violent crime with the highest recorded per capita murder rate compared to a number of countries in Southern Africa; data shows that 19,016 murder cases were recorded during 2016-2017 and the crime rate was 55.9 murdered per 100,000 of people, including students killed and injured in student housing.

Without doubt, the situation is a concern. Xaba (2006: 112) advocates comprehensive risk assessment of campuses in South Africa; i.e. to investigate university infrastructure and identify those facilities that pose safety risks to students and staff. Similarly, Langford (2004: 2) elaborates on the need for a systematic and integrated approach from university management to ensure that campuses are more safe and liveable by ensuring the safety and security of students, as well as provision of a sustainable learning environment. Dooris and Doherty (2009: 68) noted that safety, security and environment (SSE) should be a prominent concern in the infrastructure management of tertiary institution. Preiser (1995: 26) also argued that safety, security and environmental factors should be the first line of action in tertiary institutions. Gopal and Van Niekerk (2018: 173) held that legislation and policies on safety and security should be implemented and compliance ensured among South Africa tertiary institutions. Thus, a study on the safety requirements of SHF is justifiable.

### **1.2 Problem statement**

The 2011 report of the Ministerial Committee for the Review of the Provision of Student Housing in South African universities, indicates that security is a major issue across South African universities (Department of Higher Education and Training, 2011). Studies show that the safety of SHFs is not given the necessary attention in South African tertiary institutions. The neglect of safety measures of SHFs exposes students to several risks and dangers such as accidents, theft, fire outbreak, sexual harassment, assault, and worst of all, death (Xaba 2006: 565; Rodriguez *et al.*, 2013: 45; and Hemingway, 2015: 89). This situation persists despite current efforts and strategies adopted by the facilities department and Safety, Health and Environment (SHE) units of universities. Therefore, there is need to identify gaps in the current safety strategies and systems and develop a framework that can be adopted to improve the safety of SHFs in South Africa universities.

### **1.3 Research question**

This study will be guided by the research questions given in the subsequent subsections below.

### **1.3.1 The main research questions**

What framework can be adopted to improve the safety of student housing facilities in South African universities?

### **1.3.2 Sub-questions are:**

- What measures are currently in place to ensure student safety at the SHFs?
- What levels of importance do students attach to the different measures required to guarantee the safety in SHFs?
- How do students rate the risk/threat associated with the absence or lack of the different measures required to guarantee safety in SHFs?
- To what extent are students satisfied with the performance/functionality of the different safety measures provided in the SHFs?
- What framework should be developed to improve the safety of SHFs in South African universities?

### **1.4 Aim of the study**

The aim of the study is to develop a framework to improve the safety of SHFs in South African universities.

#### **1.4.1 Objectives of the study**

Objectives developed for the success of this study are enumerated below:

- To examine the measures provided to ensure that the SHFs are safe for students.
- To determine the level of importance the students attach to different measures required to guarantee safety in SHFs.
- To assess the level of risk/threat associated with the absence or lack of different measures required to ensure safety in SHFs.
- To determine the students' level of satisfaction with the performance of the different safety measures provided in the SHFs.
- To develop a framework to improve the safety of SHFs in South African universities.

### **1.5 Significance of the study**

The aim of the study is to develop a framework to improve the safety of SHFs in South African universities. The findings and recommendations of the research could be applied by the Safety, Health and Environment Units of universities (SHE) and facilities departments to improve safety measures in the management of SHFs in order to ensure safety of the students

at their various residences and, thus, improve students' satisfaction. The framework could also be adopted by campus facility managers and/or safety managers to improve on safety, security and the environment of university campuses at large. The research will add to the existing body of knowledge, and subsequent researchers will benefit from the information obtained. The information gathered through the study could serve as a basis for further research in SHF safety requirements.

## **1.6 Delimitation**

The research work will be carried out within and restricted to two universities in the Western Cape Province of South Africa. The factors responsible for the delimitation include inadequate funding, accessibility in terms of securing permission to obtain information, as well as time impediments.

## **1.7 Assumptions**

It is assumed that:

- the departments responsible for the management of security and safety of tertiary institutions in South Africa are confronted with safety and security challenges in the SHFs;
- the interviewees (safety representatives) are knowledgeable regarding the research questions and will cooperate with the interviewer by providing the required information accurately;
- the questionnaire respondents are students who stay in the SHF and are therefore able to evaluate (level of importance, threat of non-provision, performance and satisfaction) the measures required to guarantee safety in the SHF.

## **1.8 Methodology**

Research is a systematic process of collection, analysis, and interpretation of data with the intention of broadening understanding of a situation of concern or an area of interest (Ellis and Levy, 2010: 108). Research methodology offers strategies and direction for conducting a study. According to Kumar (2019: 26), research methodology particularly explains why certain data was collected, what data was collected, where the data was collected, when the data was collected, how the data was collected and how the data will be analysed.

### **1.9.1 Research method**

Struwig and Stead (2001: 45) indicated that the method of research may be quantitative, qualitative or a combination of the two method. The quantitative research method employs the

use of numerical data systematically and objectively from subgroups selected out of a population to generalise the findings (Tavakol and Sandars, 2014: 749). According to Eyisi (2016: 91), quantitative research can also be interpreted as a research method that expatiates on quantification in the data collection and interpretation. Qualitative research, on the other hand, provides researchers with tools to study complex phenomena in an area of study (Lewis, 2015: 472). Qualitative research gives a more in-depth understanding of a situation (Silverman, 2013: 54). The approach of qualitative study is based on qualitative information in the form of words, sentences and narratives (Ellis and Levy, 2010: 107).

The mixed research method is described as the combination of alternative approaches, for instance using both qualitative and quantitative methods in a single research study to ensure a better understanding of the research challenges (Tashakkori, Teddlie and Biesta, 2015: 96). Hennink, Hutter and Bailey (2010: 8) explain that the mixed method approach is very wide and combines several research methods within or across paradigms with the aim of reducing the impact of personal bias and maximizing validity in research. Mixed method research promotes the gathering of different types of data and subsequent analysis with different techniques, which gives room for various interpretations of the data. According to Eyisi (2016: 91), consideration should be given to the research problem, research questions and/or objectives of the study, and the skills of the researcher before a mixed method strategy is selected.

A mixed method was employed for this study. Firstly, this approach combines both qualitative and quantitative methods in a single research study to ensure a better understanding of the research challenges. This approach was selected because it allows close collaboration between a researcher and participants in terms of an interview, and it gives room for data collection from the population to generalise reliable findings.

### **1.9.2 Research strategy**

A case study strategy was adopted. The on-campus SHFs at two universities were studied because it helped to compare the findings from and within various campuses. This strategy helps in studying a social phenomenon through a thorough analysis of cases. Campbell and Ahrens (1998: 537) and Houghton, Casey, Shaw and Murphy (2013: 37) emphasised that the multiple case study is a strategy adopted to enable the researcher to explore differences within and between cases. Multiple case studies allow the researcher to analyse within each setting and across the settings. It also allows replication of findings across the cases by comparing, contrasting and predicting the result (Houghton *et al.*, 2013: 39).



### **1.9.3 Data collection method**

According to Nieuwenhuis (2007: 42), the method used to collect data depends on the nature of the investigation and the type of information that is required and available. Data collection involves the exploration of diverse sources of data. The data collected for a study consists of secondary and primary data. In this study, primary data was collected by means of interviews, a structured questionnaire and observations. Before the primary data was collected, a literature review (secondary data) was done on the topic. The literature was gathered from several textbooks, conference proceeding and journal articles related to study.

### **1.9.4 Administration of research instrument**

The questionnaire was designed to gather information regarding the objectives of the study from the respondents. The questionnaire was divided into five sections: the first section obtained a general profile of the respondents; the second section obtained specific information on the measures put in place to ensure student housing facilities safety; the third section focused on the level of importance students attach to different measures required to guarantee safety in SHFs; the fourth section assessed the risk associated with absence of different safety measures in the SHFs; and the fifth section explored student satisfaction with performance/ functionality of safety measures provided in the SHFs. The questionnaires were administered by hand. In addition, interviews with safety officers responsible for each campus in the study area were conducted to investigate the current approach to safety practices in the management of the SHFs and to identify those areas that need improvement.

### **1.9.5 Sampling technique and sampling size**

Whitehair *et al.* (2013: 87) described a population as a space of units from which a sample is selected. For the purpose of this study, the population was the entire group of students staying in the residences of the selected university campuses and the officers responsible for health and safety in the study area from which the samples were selected. Sampling means choosing a smaller and more manageable unit of participants (Maxwell, 2012: 120). It is often tedious to survey the entire population, therefore a manageable representative sample of students from the population was selected to participate in the survey. Quota and convenience sampling technique were used for the survey. The use of quota sampling allows the selection of all on-campus university SHFs at both universities, and a convenience sampling technique was adopted for the distribution of the questionnaire survey to the students residing in the university SHFs.

### 1.9.6 Data analysis

Data analysis deals with the examination, testing, tabulation, and categorisation of evidence to address the major proposition of a study (Houghton *et al.*, 2013: 14). Data analysis depends on the nature of data collected. For this study, qualitative data was analysed by means of thematic analysis, and quantitative data was analysed using the Statistical Package for Social Sciences (SPSS) 25. Both descriptive and inferential statistics were used. Validity and reliability of the instruments was tested. The Cronbach's alpha test was used for the reliability test. To ensure respondent validation, information gathered from the interviews was transcribed and sent back to the interviewee to check and confirm the accuracy.

### 1.9 Ethical statement

This study is carried out in accordance with internationally accepted ethical standards and guidelines relative to research and other policies. The following ethical issues were considered:

**Plagiarism:** The research acknowledges the work of others used as materials in the research work. All sources of information are identified and appropriately referenced;

**Confidentiality and anonymity:** Individual rights to confidentiality and privacy were protected in this research. Data was treated with absolute confidentiality and used for academic research purposes only;

**Honesty and trust:** The reported discussions of this research were not fabricated or misrepresented.

**Integrity:** The research was conducted with sincerity; and,

**Informed consent:** Consent of all participants and respondents were sought and no compensation whatsoever was paid to any participant in the course of the study.

### 1.10 Chapter outline

Chapters in the study are outlined below:

#### Chapter One: Introduction

This chapter consists of the introduction to the study, background of the research problem, the problem statement, the significance of the study, the research aim, research objectives and sub-objectives, research question and sub-questions, the scope and limitation of the study, key assumptions, preliminary literature review, methodology, and, finally, the ethical considerations of the study.

## **Chapter Two: Literature Review**

This chapter presents the review of relevant literature on university campus environment, scope of facility management, fire safety measures, security measures, traffic safety measures, building safety measures and general safety measures required to guarantee safety in the on-campus SHFs.

## **Chapter Three: Methodology**

This chapter examines the research method, research strategy, data collection method, administration of instrument, sampling technique and sampling size and model formation. The justification for the choices made will be presented in this chapter.

## **Chapter Four: Data Analysis and Discussion**

The chapter provides the report on the elicited data. The analyses and discussion of the results acquired in the study for the two universities were presented separately. Observation, interview, reliability testing, and results obtained from the structured questionnaires will be presented in this chapter.

## **Chapter Five: Combined and Compared Analysis**

This chapter presents the combined and compared analysis for both universities. Significant differences in the perception of respondents towards the level of provision, level of importance, level of risk and level of satisfaction with the functionality and provision of security measures, fire safety measures, traffic safety measures, building safety measures and general safety measures will be analysed in this chapter.

## **Chapter Six: Conclusion and Recommendations**

This is the final chapter that concludes the research; the conclusions and recommendations for the study will be presented in this chapter.

### **1.11 Chapter summary**

This chapter provided an overview of what is to be achieved in the research study. Introduction, background information, research question, aim, objectives, significance, delimitations, preliminary literature review, methodology and the chapter outline of the research study were all discussed briefly. The remaining chapters will elaborate on the literature review, methodology, analysis and discussion of results, and conclusions and recommendations gathered from the research.

## CHAPTER TWO

### 2. Literature review

#### 2.1 Introduction

This chapter comprises relevant literature in the area of study. Predominantly, the chapter provides a comprehensive literature review that focuses on university campus environment, SHFs, scope of FM, and measures required to guarantee safety in university SHFs.

##### 2.1.1 University campus environment

The idea of campus environment is unique; the most distinction between a campus environment and common environment is in its primary purpose of providing a supportive environment for teaching and learning (Hajrasouliha, 2017: 167). The university environment comprises physical structures in which education, teaching and research are undertaken. According to Temple (2008: 34), the learning environment may seem to be a small factor and of no significance but it plays a vital role and influences the whole learning experience. Elliott and Shin (2002: 108) argue that satisfaction actually covers issues of student perception, feelings and the outcome of their expectation during their academic year. Students expect their institution to provide safe and secure SHFs, a conducive learning environment, well-maintained and safe facilities to help them attain necessary skills and knowledge to enhance their learning experience. Sojkin, Bartkowiak and Skuza (2012: 566) were of the opinion that requirements for achieving a desirable tertiary education is meeting student satisfaction from various perspective including types of infrastructure provided, functionality/performance of this infrastructure, and how safe and secure they are on campus during their academic years. The quality of school physical environment can be traced to the general condition of school buildings (Mustafa, 2017: 412), as well as the general campus environment. Therefore, proper management of these factors and infrastructure influences student satisfaction and consequently improves the student learning experience.

Olanrewaju *et al.* (2011a: 262) clarified that infrastructure refers to fundamental facilities and systems procured in an organisation such as universities, including the services and facilities necessary for academic activities and other related functions. Generally, the range of physical infrastructure required in universities may differ from one institution to another depending on the nature of academic activities, population of students and requirements of the courses offered (Branham, 2004: 1112). Najib *et al.* (2011: 60) highlighted physical infrastructure that can be found in university which may include administrative buildings, lecture theatres, laboratories, student housing, staff accommodation, offices, libraries, workshops, cafeterias,

sports fields, roads, furniture and other supporting facilities. Simpeh (2018: 35) classified the physical facilities of tertiary institutions as:

- Teaching- and learning-related facilities: lecture theatres and halls, laboratories, workshops, libraries, computer labs and tutorial rooms and class rooms.
- Support facilities: administrative building, staff offices, student housing, staff accommodation, cafeterias (canteens), stationery shops, provision (convenience) shops, and health facilities/clinics.
- Sports and leisure facilities: sports hall (indoor), sports field (outdoor), swimming pools, gymnasiums and pubs.
- Grounds and landscape; walkways, cycle ways, bike parking (racks), roads, car parks, lawns and plants, outdoor learning spaces.

All this infrastructure has varying but considerable effects on the success of the totality of teaching, learning and research carried out in a university. The student housing facility (SHF) is one of the facilities that influences student satisfaction in a university.

### **2.1.2 Student housing facilities (SHFs)**

Housing is one of the basic needs of human life. According to Ibrahim, Musonda and Ibrahim (2018: 01), student housing is an essential component of facilities provided by higher learning institutions to assist students to strengthen their intellectual capabilities while pursuing their academic career. Najib, Yusof and Tabassi (2015: 495) define a SHF as a building primarily constructed to provide sleeping and residential quarters for large numbers of people such as college and university students. Najib *et al.* (2011: 201) described a SHF as a unit of en-suite single room or multiple single rooms in a shared apartment, where amenities are also shared among rooms and flat mates. In addition, Oke, Aigbavboa and Raphiri (2017: 653) indicated that university SHFs are usually located within the boundaries of the university (on-campus residence) or outside of university (off-campus residence). Whether located on or off campus, SHF must primarily provide students with an environment that supports the living and learning experience of student (Najib *et al.*, 2015: 495).

Ibrahim *et al.* (2018: 5) commented on the importance of SHFs which have been regarded as a tangible marketing tool and a channel used by many universities to demonstrate their uniqueness, generate income and exhibit their qualities. Similarly, Hassanain (2008: 213) acknowledged the significance of SHFs to student academic achievement, as such facilities are provided with the aim of assisting students to have easy access to learning facilities and lecture theatres. Too and Bajracharya (2015: 58) further elucidate that SHFs offer students a feeling of home away from home and influence a desirable educational outcome. Studies

conducted by Najib *et al.* (2011: 59), Olanrewaju *et al.* (2010a: 101), and Hassanain (2008: 213) report the influence of university SHFs on the well-being and learning experience of students. Najib *et al.* (2015: 494) discovered that SHFs have a significant impact on student behavioural attitude towards their studies which might influence their study performance positively or negatively depending on their comfort and safety at their various residence.

Oladokun and Ajayi (2019: 63) are of the opinion that provision of certain spaces and amenities in the SHFs such as fitness centre, internet access, satellite/DStv, dining, TV room and common spaces to socialise or study within the SHFs could enhance the integration of students into a new academic community. Bella-Omunagbe (2015: 18) state that SHFs promote unity between roommates of different cultures, different background, different race and different specialisations, as well as provides a conducive environment that encourages intellectual development among students. Hassanain (2008: 214) clarified that SHFs provide a sense of community settings among students in tertiary institutions. As a matter of fact, SHFs play a crucial support role in quality higher education and as well provide a fulfilling living experience for students ( Bella-Omunagbe, 2015: 212). Najib *et al.* (2011: 53), Spio-kwofie, Anyobodeh and Abban (2016: 64) and Oke *et al.* (2017: 652) also highlighted the following as significance of SHFs:

- Determine students' choice of institution;
- Enhance students' academic achievement;
- Encourage students' behavioural attitude towards learning;
- Promote mutual interaction and intellectual communication among students;
- Eradicate transportation issues (on-campus);
- Proximity benefit to learning facilities and lecture venues;
- Sources of income to the university and private entities;
- Help students to integrate well into a new academic community; and
- Promotes quality higher education and represents the image of an institution.

Despite the importance of SHFs in higher education institutions, in recent years, safety and security have become a major challenge in SHFs globally. This has been a topic of interest among researchers and universities in South Africa institutions which demands urgent attention (Rodriguez *et al.*, 2013: 42).

### **2.1.3 Safety and security gap in SHF studies**

Historically, safety research has focused on design and construction phases, therefore maintenance personnel in the field of FM are unwilling to adjust to the current safety trend in maintenance of facilities (Wetzel and Thabet, 2015: 12). Safety and security have become a

topic of interest among researchers and universities in the management of SHFs in both on-campus and off campus residences (Hassanain 2008: 212; Rasmussen, Chris and Gina-Johnson, 2008: 6). Studies show that safety and security is not given adequate attention in South African student housing (Rodriguez *et al.*, 2013: 37). Atkin and Brooks (2015: 85) and Babatunde and Perera (2017: 65) observed that safety and security is an important aspect of housing which is often seen as a lower priority issue by many institutions and organisations. Furthermore, Najib *et al.* (2011: 201) explain that student housing offers limited safety and security services and university management and hostel managers often gives unnecessary access to complete strangers to student accommodation due to poor access control, lack of CCTV and irregular presence of security personnel.

Moreover, Atkin and Brooks (2015: 94) argued that safety, security and environment in the management of facilities in many organisations and institutions have become a global issue. Hassanain (2008: 212) held that improvement is needed in the aspect of safety and security in the management of SHF as the rate of accidents, sexual harassment, injury, gunshot injury, fire outbreak and theft increases on a daily basis in many SHF around the world. Similarly, Rodriguez *et al.* (2013: 39) advocated for more studies on SHFs in order to identify the causes and possible solution to safety and security issues in SHFs in South Africa.

Several studies on SHFs in the broader scope have been carried out globally and in South Africa. Some of the SHF studies carried out include:

- 'Performance evaluation of sustainable student housing'. This study was conducted in Saudi Arabia by Hassanain (2008). The study focused on maintenance with a view to user satisfaction.
- 'Student satisfaction with hostel facilities in Nigerian Polytechnics', carried out in Nigeria by Toyin and Yusof (2013). The focus of the study was on the adequacy of facilities provided in student's hostels.
- 'Prioritisation of spaces and services in on-campus student housing facilities in southern Ghana universities', conducted by Simpeh (2018) in Ghana. The study focused on the prioritisation of on-campus SHFs spaces and services. The author developed a prioritisation system to guide the provision and management of the spaces and services required in SHFs.
- 'Quality assessment of student housing facilities through post-occupancy evaluation at one of the leading Malaysia universities. The study was conducted by Sanni-Anibire and Hassanain (2016). The study focused on satisfaction with accommodation.

- 'Service quality of on-campus student housing: a South African experience'. The study was conducted by Whitehair *et al.* (2013). The study focused on how to introduce food waste behaviour change into a dining facility in student residential halls. The author developed an intervention poster used to encourage food waste behaviour change in a university residence dining facility.
- 'Importance level of on-campus SHF spaces: perception of postgraduate students in one South Africa university', a study conducted by Simpeh and Akinlolu (2018). The study focused on the level of importance students attached to the spaces required in an on-campus SHF. The authors acknowledge that SHFs are one of the most important facilities for students and as such, developers and facility managers should ensure that the provision for SHF spaces meet the genuine requirements of students.
- 'Students' satisfaction level with hostel accommodations in higher education institutions', a study conducted by Oke, Aigbavboa and Raphiri (2017). The study also focused on factors that can attract and retain students at their residences.

Although a reasonable number of studies on SHFs in the broader scope have been carried out as shown above. Studies that primarily address safety and security measures concerning SHFs from the perspective of students is quite lacking. In fact, there is a lack of research on SHF safety in South African universities. In the South African context, studies that mainly focused on safety of university infrastructure include:

- 'A holistic approach to safety and security at schools', a study conducted by Xaba (2006);
- 'School safety and security: a management challenge to principals in the Vryheid', by Chukwu (2008);
- 'An exploratory study of first year residence students' perceptions regarding safety and security', conducted by Ingrid (2010).

All these studies primarily focused on how students' social life affects their safety and security on campus and not from an infrastructure perspective. Rodriguez *et al.* (2013: 47) note the lack of such studies and solicited more research work on safety and security in SA tertiary institutions. Hence, there is a need for studies on how to improve the safety and security of university infrastructure such as SHFs in South African tertiary institutions. To start with, it is important to acknowledge the importance of adopting the right principles and approach to the management of university infrastructure including SHFs. Facility Management (FM) has



gained recognition as an effective approach to the management of infrastructure or facilities. FM is therefore discussed in the next section.

## **2.2 Facility Management (FM)**

Atkin and Brooks (2015: 5) described FM as an integrated approach to operating, improving, adapting and maintaining buildings and infrastructure of an organisation such as universities in order to create an environment that adequately supports the primary objectives of such organisation. The South African Association of Facility Management defines FM as: ‘an enabler of sustainable enterprise performance through the whole life management of productive workplaces and effective business support services’ (SAFMA, 2018). The international facility management association (IFMA, 2018) also defines FM as ‘a profession that encompasses multiple disciplines to ensure functionality, comfort, safety and efficiency of the built environment by integrating people, place, process and technology’. The definition of IFMA gives an indication of the importance of safety. Ultimately, FM ensures that facility resources and services are provided to add value to the core business of organisations (Simpeh and Shankantu, 2019). Hence, the right application of FM techniques would allow organisations such as tertiary institutions to provide the right environment for conducting its academic activities and deliver end-user satisfaction (Awang, Mohammed, Rahman, Abdullah, Mod, Sani, and Hamadan, 2012: 755).

### **2.2.1 FM contribution in the management of university infrastructures**

The discipline of FM has found scientific recognition in the academic world (Junghans and Olsson, 2014: 2). The role of FM as an academic discipline in higher education plays a crucial part in individual and societal advancement (Kok *et al.*, 2011: 249). Coenen, Alexander and Kok (2013: 342) explain that in academic settings, the primary responsibility of FM lies within satisfying internal stakeholders in terms of building users (students). Junghans and Olsson (2014: 3) commented on the extent of inclusion of FM in educational settings which include infrastructure management, usability, maintenance, added value and hospitality. Mustafa (2017: 412) acknowledged that in the past decades, there was only fleeting mention of FM in terms of academic progress, and its scope only focused on ensuring that buildings were maintained, serviced and cleaned.

Coenen *et al.* (2013: 343) postulated that FM knowledge and principles can be applied in an academic setting to study users’ characteristics, needs and behaviour, with the aim of identifying services that contribute to their satisfaction and how their behaviour affects services and facilities provided. Atkin and Brooks (2015: 6) pointed to factors that ensure user satisfaction such as maintenance management and quality of services provided. Coenen *et*

al. (2013: 343) conclude that if a facility is not managed properly, it can impact upon the organisation's performance and also affect the safety and well-being of facility users. Conversely, a well-managed facility can enhance performance by contributing towards the provision of the optimal working environment. FM is however multifaceted and wide-ranging. Thus, the next sections discuss the scope of FM.

### 2.2.2 Scope of facility management

FM covers a wide range of components and functions including; real estate and property management, facility project management, maintenance and repairs, building services and operations, office services, planning and programming, space planning and management, operation administration and employee support and services (Chotipanich, 2004: 365). FM covers: operations and maintenance, real estate, human and environmental factors, planning and project management, finance, quality assessment and innovation, as well as communication and technology (Hauptfleisch, 2018: 5). Atkin and Brooks (2015: 6) highlighted maintenance management, financial management, human resources management, cleaning, catering and utility supplies as aspects of FM.

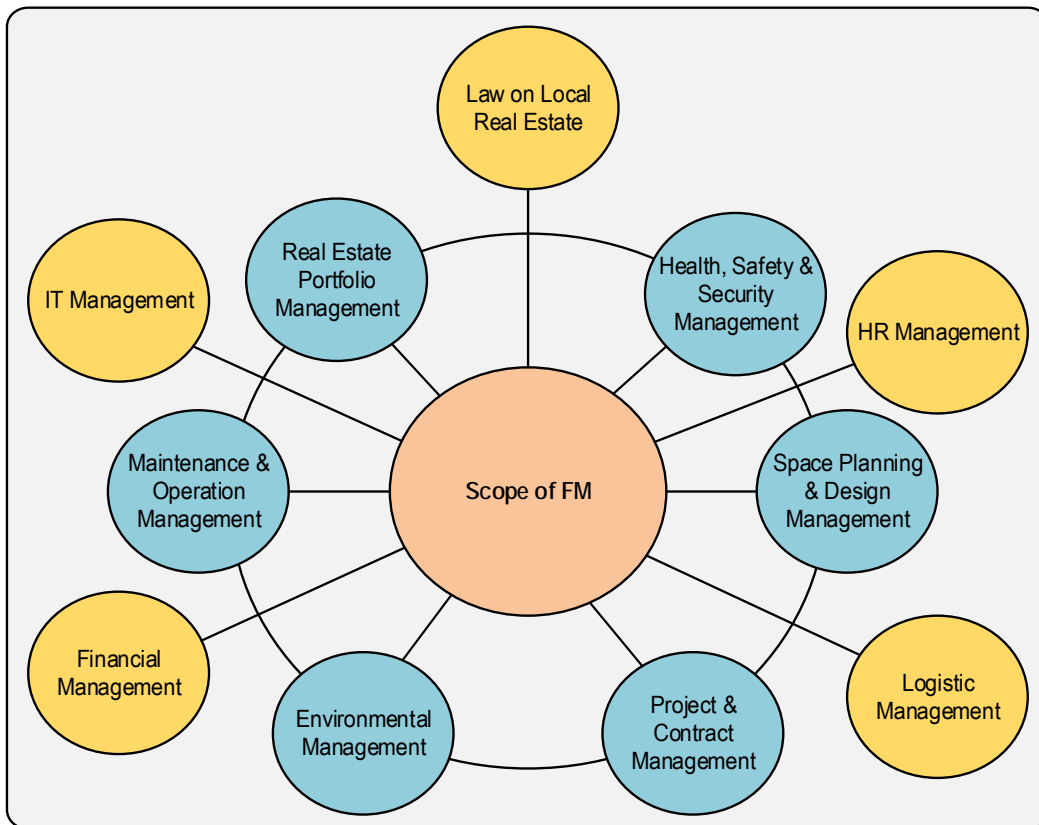


Figure 2.1: Body of knowledge in FM Hong Kong Institute of Facility Management (2010)

Atkin and Brooks (2015: 86) elucidate that due to a large body of legislation designed for the work place, health, safety, security and environment (HSSE) has become an important part of FM function. Similarly, Hauptfleisch (2018: 6) emphasised that safety, health, environment and quality has been regarded as some of the knowledge areas in FM. According to Atkin and Brooks (2015: 3), facility managers are now charged with the responsibility of ensuring that the infrastructure is well provided, functional, secured, and safe through a continual search for ways to improve quality and minimize the risk. Hence, FM is about empowering people through provision of a safe and secured infrastructure that add value to their core business and their day to day activities (Hauptfleisch, 2018: 5). As a matter of fact, the definition of FM provided by International Facility Management Association (IFMA) also incorporate safety.

The need to prioritise safety in the SHFs in SA is well highlighted and discussed in the first chapter of this thesis. Xaba (2006: 565) and Atkin and Brooks (2015: 89) highlighted the general and basic safety and security features that should be prioritised in academic physical environment in the areas such as:

- Buildings: general condition of cleanliness and safety, ventilation, floor, wall, openings, ceiling, roofing, hallways, stairs, building exit, verandas and lighting.
- Safety system: Safety signs and notice boards, fire precautions (e.g. fire alarm) accident prevention and report system, emergency preparedness on campus, parking and vehicle control, sanitation system, drainage condition, refuse disposal system and general access control to the campus.
- Facilities: such as adequate fire extinguisher, toilet facility, First Aid equipment, furniture, electrical cable condition, lighting at night, security of school fencing and device to monitor activities
- Ground: safety of campus road, sport field, and layout of vegetation.

The majority of these safety and security features would be required in every facility including the SHF. However, other important measures may also be required to guarantee safety in a SHF. Thus, the various measures required to guarantee SHF safety is discussed below.

### **2.3 Measures required to guarantee safety in the SHFs**

Several factors influence the safety of students living in SHF. These factors could range from the building itself to the surrounding environment. In this study, the various factors are classified into five measures. These five measures are discussed below. For each measure, a general overview is provided, the risk associated with the lack, and the specific elements required to guarantee the safety of SHFs is discussed.

### 2.3.1 Fire safety measures

Campus buildings, particularly students housing, is vulnerable to fire incidence because of their high fire load which can as well be described as the amount of fuel contained in the building (Babatunde and Perera, 2017: 69). Student housing is a major type of building that provides shelter for students attending college or university; consequently, it student housing are expected to comply with certain requirements such as fire safety requirements, building codes and other safety features for conducive living, learning and academic success among students (Parameswaran and Bowers, 2014: 57). Hassanain (2008: 55) described fire as a rapid oxidation of a material in the exothermic chemical process of combustion, releasing heat, light and various reaction products capable of causing destruction or damage to properties and claim lives. Mustafa (2017: 413) specifically explained that fire in buildings develop when a heat source comes in contact with a sufficient amount of combustible materials in the presence of oxygen.

Whitehair *et al.* (2013: 5) elaborated on the kind of fuel that could be found at student housing such as furniture, books and papers, plastic, clothing, curtains, and other consumable materials which are susceptible to fire. According to Chen *et al.* (2012: 312), prevention of fire-related injuries in university facilities incorporates basic fire safety measures in the building. Based on the investigation carried out internationally in a Chinese university building to reduce fire-related injuries on campus, the impediment factors identified include evacuation time and movement and obstructions during a simulated fire emergency. The result suggests that the size of the corridors has an influence on variable thermal temperature and smoke density which also exerts great influence on burn injuries (Chen *et al.*, 2012: 314). Similarly, Xie, Wang and Hensen (2016: 189) observed that fire and other disasters will often result in a much greater loss of life and damage to properties and facilities where emergency exits are not up to standard.

Similarly, Xie *et al.* (2016: 188) commented on the effect of the distance between exits and considered it a critical safety issue in fire protection design. According to Chu, Wen and Huang (2019: 2), the distance between exits in buildings has created many challenges in evacuation during emergencies. Xie *et al.* (2016: 186) further explained that the larger the distance between exits, the longer the travel distance of some occupants would be which will consequently reduce evacuation efficiency of a crowd (i.e. students) during an unexpected emergency occurrence. In addition, Fang, Song, Zhang and Wu (2010: 815) report that the evacuation process in an academic building with two neighbouring exits was investigated by means of experiment and modelling and basic parameters such as flow, density, and velocity of pedestrians in the exit areas were measured, the exit-selecting phenomenon in the

experiment was analysed and it is found that pedestrians prefer selecting the closer exit even though the other exit is only a little further.

According to South African National Building Regulation and Building Standards Act. 103 of 1977 (SABSSC59Q) where the travel distance is more than 45m, two or more escape route should be made available. Similarly, where a building has a population of more than 25 persons and the escape route exceeds 35m, an additional emergency exit must be provided (Saferspace, 2017: 5). Zhao, Zhu and Zou (2008: 519) further explain the effect of the distance between exits in the building during evacuation time and hold that the layout of exits should be symmetrical for higher crowd evacuation efficiency and the optimal value of distance between exits should approximately equal to 3/10 of the total length of the wall which is independent of exit width.

### **2.3.1.1 Causes of fire accidents in the SHFs**

The larger percentage of fire and fire related incidence and accidents in the SHF occur when universities and colleges are in session; occurrences are dramatically reduced during midterm and summer breaks when institutions are not in full session (Hassanain, 2008b: 56). Kern, Hebner and Campagnola (2004: 25) state three major causes of fire in university student housing namely: building condition; human behaviour; and consumer products.

#### **2.3.1.1.1 Building condition**

Jackson, Wilson, Akoto, Dixon, Jacobs and Ballesteros (2010: 543) identified the following as building conditions responsible for fire hazard in SHFs and other campus buildings: lack of thermal insulator material in the building, poorly serviced and insufficient fire safety measures/equipment, exposed live wires from missing electrical protectors, malfunctioning or absence of fire alarm systems. Chen *et al.* (2012: 313) commented that while universities are striving to improve the level of fire safety in SHFs through implementation of policies and regulations, an overload of combustible materials in SHFs and interior contents such as furniture, floor and wall finishes and electrical appliances like use of light bulbs of higher wattage than the maximum specified for the lampshade, use of microwaves and refrigerators, usage of fluorescent light tubes which are capable of producing intense localised heat sufficient to cause fire and internally damaged electrical cords which can allow sparks between the conductors often undermined this effort.

#### **2.3.1.1.2 Human behaviour**

Human behaviour has an impact on fire related problems in SHFs. The use of alcohol and other drug abuse among campus residents is increasing (Kern *et al.*, 2004: 25). According to

the US Fire Administration (2015), campus fire fatalities in residential buildings has been traced to human factors. For example, smoke alarms were either missing or had been tampered with, fire sprinklers were not present in any of the 85 campus residence buildings, leading to the death of an average of 10 students annually. Rodriguez *et al.* (2013: 56) pointed out that in South African tertiary institutions SHFs are not exempted from fire outbreaks. Hot plates used for cooking left unattended to by the students are reported to be the second leading cause of fire outbreak in SHFs, smoking was ranked as the third leading cause, as flaming cigarettes might be carelessly thrown and mixed with trash in the can (Sanni-Anibire and Hassanain, 2015b: 354). Hassanain (2008b: 57), Jackson *et al.* (2010: 44) and Najib *et al.* (2011: 55) highlighted other causes of fire in SHFs such as open flame fires emanating from candles lit for decorative purposes, overloaded electrical outlets, space heating equipment and misuse of electrical appliances by the students.

#### **2.3.1.1.3 Consumer products**

Certain consumer products contributes to fire hazard in student dormitories (Tufts University, 2019). According to Kern *et al.* (2004: 25), some universities have begun to prohibit highly combustible products in some on-campus residence such as halogen lamps because of their extremely high operating temperatures that are capable of igniting the nearby combustible materials. Likewise, lamps that are often sold with bulbs of 300 watts and 500 watts, and other products including candles, hairdryer, pressing iron, stoves that produce flame, hot plates, and highly combustible mattress.

#### **2.3.1.2 Risk/threat associated with lack of fire safety measures in the SHFs**

SHFs play a major role in tertiary institution with a large number of occupants. Nevertheless, statistics state that fire related matters are often potential risk factors globally (Gerson, Allard and Towvim, 2005: 157). According to Agyekum *et al.* (2016: 439) students living on campus experience increases in fire related incidents on a yearly basis, and an average of 3,800 fires on college and university campus housing facilities are reported. Rodriguez *et al.* (2013: 42) and Oke *et al.* (2017: 656) stated risk associated with poor performance of certain fire precautionary measures in SA student housing; the argument was made that fire hazard and electrocution incidents are also a potential risk factor in university infrastructure in South Africa tertiary institutions, with 93 incidents of fire outbreak occurring throughout the country in the year 2013. Rodriguez *et al.* (2013: 45) pointed to other risks such as electrical fire which constituted 8% and faulty extension cords from the offices, lecture theatre, student housing as well as appliances and plugs.

Similarly, Sanni-Anibire and Hassanain (2016: 368) explained that many more fire incidents occurred unreported due to effort from students and campus safety and security personnel to quench them. However, these small fires have the same potential to cause fire outbreak or fire disaster on campuses. Rodriguez *et al.* (2013: 42) stressed the risk associated with fire hazard in SA campus residential buildings with statistics indicating that over 96 students died in student housing as a result of fire disaster and many more injured from burns, inhalation of smoke and attempt to escape from building openings. Consequently, it is evident that fire related incidents are a threat to life and one of the potential risk factors in the SHFs. Therefore, it is essential to identify fire safety measures required to guarantee safety in the SHFs and make necessary provision for such measures.

### **2.3.1.3 Fire safety measures required in the SHFs**

The National Building Regulations and Building Standards Act No. 103 of 1977 of SA reveals the following as important fire safety requirements: escape door, escape route, feeder route, fire extinguisher, fire hydrant, foam inlet, fire main, fire pump connection, fire stopping, heat detector, hose reel, rising main, reflux valve, smoke detectors, sprinkler system, smoke extractor and valve (SA Government Notice, 2008). Similarly, Hassanain (2008a: 215) proposed five performance measures in fire safety for campus building such as student housing which include ease of identifying emergency exits to occupants and visitors, of exiting the building in case of fire emergencies, the of identifying and reaching fire alarm systems, and quality/functionality of fire safety systems in the building.

Muckett and Furness (2007: 207) further explained that a fundamental aspect of any means of escape in multi-storey buildings is the availability of sufficient numbers of adequately wide, unobstructed and protected escape stairways. “In order to expedite the evacuation of a workplace in case of fire, every employer or institutions shall ensure that any emergency escape door from any room or passage or at a staircase shall as far as is practicable be hung so as to open outwards”, “every door of a room in which persons may be present, and every door of a means of exit from such room, shall be kept clear and capable of being easily and rapidly opened from inside so as to ensure quick and easy evacuation” (South African Occupational Health and Safety Act and Regulations 85 of 1993).

Additionally, Hassanain (2008b: 59–60) suggested two measures to prevent fire hazard in SHFs which include:

1. Measures to prevent fire hazard in form of written policy for students who are registered member of SHFs and visitors.

Student housing managers may guide student living in the residence with the intention of reducing ignition sources by adopting a written policy as a guideline for students to avoid the following dangerous acts: the use of open flames, smoking in the rooms, the use of toaster ovens, space heaters and halogen lamps in the rooms; prohibit nonchalant attitudes towards lights and other electrical appliances in the rooms and kitchen; the use and running of the electrical extension cords under carpets, dry clothing on heating unit or other hot areas; keeping curtains, draperies, clothing, bedclothes, and free hanging decorations close to lamps or electricity (Hassanain, 2008b: 59–60).

## 2. Measures to prevent fire hazard in SHFs for the facility manager/hostel managers.

The fire safety practices that would help facility managers and hostel administrators to mitigate and prevent fire outbreak incidences in SHFs are: evaluating the students' living spaces with aim of reducing fuel load and ignition sources by carefully reviewing the materials used in constructing the structural system of the SHFs such as interior finish, furniture, clothing and books; maintaining the provision and frequently testing automatic sprinkler system in SHFs; ensuring that working staff are familiar with all safety precautions, location and use of fire protection and safety equipment; maintaining the provision of un-obstructed and well illuminated fire exits; ensuring that working staffs are aware of the emergency evacuation plan for their facility; maintaining the provision of frequently-tested smoke detection and fire alarm systems; maintaining the provision of accessible stand-pipe systems; maintaining the provision of adequate and accessible portable fire extinguishers; ensuring that the facility is in compliance with on-site fire safety regulations; ensuring that emergency drills are conducted regularly to test the performance of the evacuation plans and rescuers; modification if any to the building or area of the building is approved through the proper municipal authorities; and strictly enforcing operational policies restricting smoking inside the facility (Hassanain, 2008b: 60).

### **2.3.2 Building safety measures**

Buildings are premises or housing constructed under building rules and regulations which encompass basic components such as foundation, floor, walls, openings and roof for the purpose of providing shelter, privacy, protection and comfort to their occupants (Aibor and Olorunda, 2006: 113). According to Wood (2005: 291), a building can be defined as physical structure built to envelop external environments in order to create an internal condition that supports human needs. Becker and Steele (1990: 13) elaborated that buildings can be likened to living things that need to be understood, nurtured and maintained for safety purposes. Hassanain (2008b: 225) postulated that building safety and durability is associated with the quality of materials used in construction with critical consequences for the life of occupants. It



is essential to understand that the provision of a safe building is an important aspect of campus environment (Ibrahim *et al.*, 2018: 2). Aibor and Olorunda (2006: 113) and Bella-Omunagbe, Shakantu, Eyk, and Werner (2016: 1391) commented on the characteristics that a safe university building such as SHFs must possess. They must;

- Be sited in a safe environment and made permanent on a good soil;
- Be built with a damp-proof course and a smooth floor with moisture resistance;
- Be built with a strong wall and waterproof roof;
- Have adequate ventilation in the openings for the indoor air quality;
- Have good natural and artificial lighting;
- Have proper drainage system;
- Be provided with adequate water supply and sanitary conveniences;
- Have good interior and exterior finishes; and
- Have showers and toilet facilities in good condition.

### **2.3.2.1 Causes of accidents in SHFs**

Accidents and injuries frequently occur in SHFs. Whitehair *et al.* (2013: 64) and Agyekum *et al.* (2016: 442) highlight certain building elements that students interact with in their various residences that deserve adequate safety measures to prevent unforeseen accident or injuries that may occur, such as exterior and interior walls, interior finishes and floor surfaces. Common safety challenges allied with exterior walls include cracks and dilapidated condition, sudden collapse of partition wall in the hostels liable to claim lives, wind infiltration, colour fading, moisture, spilling, buckling, delamination, cracking, dampness and erosion effect Straube and Schumacher (2007: 42). Hassanain (2008b: 225) and Toyin and Yusof (2013: 309) mentioned floor surface resistance to moisture and scratches, indentation, stain, and cigarette burns as a crucial aspect in building safety. Preiser *et al.* (2006: 38) stress that to achieve safety in buildings, the quality of construction and choice of materials should be compatible and complement the existing physical environment.

Additionally, Agyekum *et al.* (2016: 2181) argued that student housing rooms should be provided with cost-effective, fire resistance and easily repairable doors with security locks. According to Hassanain (2008b: 213) and McBride (2017: 196), bathrooms floor, showers, water closet and washing basin are essential part of interior finishes with potential risks as student are not often careful in the way they use these facilities. Therefore, it is important to provide safety and warning signs and should be placed in conspicuous areas to avoid burns and scars from hot water and overflowing or leaking showers.

### **2.3.2.2 Risk/threat associated with absence of building safety measures in the SHFs**

Olanrewaju *et al.* (2010: 120) identifies certain factors and condition of facilities in the university buildings that can cause accidents on campus such as elevator failure, faulty electrical system and absence of sufficient safety signs in the appropriate designated areas. Other potential sources of risk/accident in the SHFs include overflowing and leaking showers, bathrooms without moisture resistance finishes, damaged water closet, crack walls and broken windows, damaged stairways and unsafe balustrade/handrails (Whitehair *et al.*, 2013: 6).

Xaba (2006: 45) is of the opinion that a school building's quality may deteriorate as a result of age and lack of maintenance, which may render it unsafe for its occupants as older buildings become obsolete with no or little capacity to accommodate renovations. Branham (2004: 1112) stated that if a building has a broken window and the window is not replaced, all of the other windows will soon be broken as one broken window is an indication that no one cares. Such neglect will then bring about a culture of disorder, fear and isolation. According to Aibor and Oloruda (2006: 322), Aigbavboa and Thwala (2012: 2), and Amsterdam (2013: 2), students living in buildings with poor indoor air quality often suffer from symptoms such as eye, nose and throat irritation, dry skin and mucous membranes, fatigue, headache, wheezing, nausea and dizziness as a result of discomfort. Chithra and Nagendra (2012: 159) emphasised that the safety and well-being benefits associated with an acceptable indoor air quality in student housing include prevention against suffocation owing to availability of sufficient air exchange in the room, air filtration to eradicate particles which causes respiratory ailments and providing sufficient fresh air to get rid of odour and smoke. Chen *et al.* (2012: 311) indicated that adequate ventilation is key and good indoor air quality is an integral constituent of a pleasant and productive indoor environment. Shiel, Leal, Paço and Brandli (2016: 123) also advocated safety improvement in the management of university buildings. It can be deduced from the preceding that the lack of building safety measures could result in accidents and consequently jeopardise the safety of the occupants (students).

#### **2.3.2.2.1 Building safety measures required in the SHFs**

Hassanain (2008: 215), Olanrewaju *et al.* (2010: 85), Rodriguez *et al.* (2013: 47) and Atkin and Brooks (2015: 86) highlighted the following as building safety measures required in the SHFs: burglar bars on the windows, burglar bars on the doors (if need be), handrails on the stairs, tiles on the floor, escape/emergency doors, walls well plastered (no cracks), rooms well ventilated, lift for disabled students, covered outdoor water mains/manhole, covered indoor water mains/manholes and adequate lighting. Preiser and Nasar (2008: 84), Sanni-Anibire and Hassanain (2016: 253) stated that to achieve safety and satisfaction in SHFs, the quality

of construction and choice of materials should be compatible and complement the existing campus physical environment. Hassanain (2008: 40) posited that campus residence rooms should be provided with controllable windows to regulate and accommodate ventilation, and curtains or blinds should be available to allow full control of the amount of daylight and temperature needed per period in a room for occupants to stay safe and healthy.

Aibor and Oloruda (2006: 322) highlighted water supply facilities, waste discharge system, overall water capacity of a building, adequate ventilation, functional facility for the provision of cold and hot water to support cleaning and hygiene needs and general environmental condition of the student housing as other aspect of building safety.

Hassanain (2008: 46) commented that lack of timely and adequate maintenance might aggravate safety issues in the management of facilities such as student housing. McArthur (2015: 1104) further explained that lapses in the maintenance of infrastructure could expose end users and maintenance staffs to a constant risk of electrical shock, slip, falls, crushing, cuts and bruise, and increases the rate of injury, illness and accidents in SHFs. The National Institute of Occupational Safety and Health (NIOSH), affirms that many of the recorded injuries and accidents could have been avoided had appropriate maintenance and hazard mitigations been put in place (Branham 2004: 1113). Olanrewaju (2009: 208) described maintenance as a process of ensuring that buildings and other facilities and assets maintain a good appearance, operate at optimum efficiency, prevent process of decay and degradation and retain structural stability and safety. Effective maintenance is needed to ensure that the safety measures provided in the SHF retains its high level of performance.

### **2.3.3 Traffic safety measures**

Road traffic accidents is generally a global concern; nearly 1.2 million people are killed annually as a result of traffic accidents and 50 million are injured (Nteziyaremye and Sinclair, 2013: 1). Pedestrians form an integral part of campus settings and the interaction between the motorist and the pedestrian at a crossing without signals is a major concern in traffic safety in learning environment and public roads (Rodriguez *et al.*, 2013: 43). In South Africa, pedestrian fatalities result in more than 40 percent of all road traffic accidents (Nteziyaremye and Sinclair 2013: 486).

#### **2.3.3.1 Causes of road accident on campus**

Car accidents are the number one leading cause of death among college and university students; the high foot traffic and high vehicle traffic nature of universities makes accidents a real factor (Schwebel, Stavrinou, Byington, Davis, O'Neal, and De Jong 2012: 266). In recent years, the addition of cell phones has added to car accidents within university age group.

Nasar (2003: 157) commented that both intentional and unintentional accidents occur on campuses as a result of unsafe actions such as motorists not yielding to pedestrians crossing the road, lack of safety road signs, illegal parking resulting in traffic congestion on campuses and lack of drop-off/pick-up zone. Crowley, Houten and Lim (2011: 121) observed that vehicles exceeding speed limits owing to absence or inadequate traffic lights for vehicular control is another potential factor resulting in accident on campuses. Eckert (2012: 350) held that campuses with poor physical environment as well as damaged walkways also contribute to road accidents. Schwebel *et al.* (2012: 266) highlighted factors that contribute to road traffic-related injuries on university campuses including:

- Distraction among pedestrians on-campus and off-campus,
- Motorists not yielding to road stop signs on-campus and off-campus, and
- Non-compliance with road/traffic policy on-campus and off-campus.

#### **2.3.3.1.1 Distraction among pedestrians**

Schwebel *et al.* (2012: 267) stated that pedestrians who are distracted by the use of devices like mobile phones and extensively engage in conversations and other activities such as eating, playing and listening to music while walking and crossing the road to their residence are often exposed to greater risk. According to Hatfield and Murphy (2007: 197), the use of multimedia devices among university students on both off and on campus road has caused a greater likelihood of collision with vehicles. A study conducted by Horrey and Wickens (2006: 201) found that texting of messages while walking is a risk factor which requires safety education for the university students.

#### **2.3.3.1.2 Motorist not yielding to road stop signs on campus**

Pedestrians on university campuses interact continually with different kind of motorised vehicles and state of mind and behavioural attitude of drivers towards road signs is quite different (Schwebel *et al.*, 2012: 266). In most large urban campuses, the rate of compliance with stop signs at pedestrian crosswalks was found to be very low compared with non-complying vehicles (DeVeauuse, Kim, Peek-Asa, McArthur, and Kraus 1999: 269). Research conducted on campus pedestrian safety by Hatfield and Murphy (2007: 198) reported that the overall compliance rate for stop signs was 22.8 per 100 vehicles, for bicycles 46.2 per 100, and commuter vans, likewise; it was also found that the rate of compliance somehow increased to 53 per 100 vehicles when pedestrians were present in the crosswalk; though the lowest compliance was observed for bicycles and motorcycles on campuses.

#### **2.3.3.1.3 Non-compliance to traffic policies**

University and college campus injury risk increases because of violations of pedestrian right of way laws and ignoring policy/rules (Schwebel *et al.*, 2012: 267). Generally, pedestrian injury represents a major public health issue. It is advocated that campus roads ought to be well resourced with adequate road safety measures, and road law enforcement officers should be appointed to large urban university campuses that include massive on-campus student housing facilities for vehicle monitoring (Rodriguez *et al.*, 2013: 47).

### **2.3.3.2 Risk associated with absence of traffic safety measures in an on-campus SHF**

Accident and injuries are evident across tertiary institutions, lives are not valued and there is an increase in the number of injuries sustained which have resulted in temporary or permanent deformity (Rodriguez *et al.*, 2013: 46). National Highway Traffic Safety Administration (2009) stated that campus traffic safety lapses in 2009 when nearly 800 young Americans between the ages of 16-29 were killed by pedestrian-related injuries and almost 16,000 were hospitalised. Similarly, Seedat *et al.* (2009: 1012) commented on traffic-related injury in South African universities such as an incident reported at Unisa Muckleneuk main campus in Pretoria 2002. The study found that participants had witnessed a total of six traffic accidents involving pedestrians crossing which often occurred during morning and afternoon peak traffic hours when student are in hurry to cross the road to their residences. Consequently, institutions should make endeavour to protect students from risk such as accident, injury, temporary and permanent deformity and unforeseen traffic-related injury such as death.

### **2.3.3.3 Traffic safety measures required in on-campus residences**

General traffic safety measures are enormous. These are the traffic safety measures considered to be of importance in campus settings as stated by Hatfield and Murphy (2007: 198), Schwebel *et al.* (2012: 267) and Rodriguez *et al.* (2013: 45) including:

- Pedestrian walkways,
- Pedestrian crossing signs,
- Speed bumps,
- Adequate parking space,
- Guard for vehicle monitoring,
- Vehicle access control,
- Parking area for people with disabilities,
- Traffic signs, and
- Traffic lights (also serves as means of educating students on campus).

Xaba (2006: 566) advocated safe parking areas, road speed bumps, road signs, adequate pedestrian walkways and pedestrian crossing road signs on SA campuses. The need to ensure adequate road safety measures and the appointment of a road law enforcement have also been proposed as some measures (Rodriguez *et al.* 2013: 47).

#### **2.3.4 Security measures**

Security measures are the sole responsibility of any organisation by law and effort should be made to comply in order to protect against crime, violence, theft, accident and ensure a conducive working environment (Atkin and Brooks 2015: 95). South African tertiary institutions are characterised by exceptionally high mortality rate due to lack of security measures on campuses (Seedat *et al.*, 2009: 68). Lindegaard and Henriksen (2005: 57) emphasised that security on campus is beyond creating orderliness in relation to violence but measures should be put in place to protect and safeguard students. Hassanain (2008b: 210) held that to attract and retain students, universities should endeavour to provide housing that is safe and secure for the students. Free movement at night both on and off campus residences without threat can stimulate experience and good relations within the student (Gopal and Niekerk, 2018: 173). Hassanain (2008b: 211) further explained that students perform better in their studies if they have safe, secure and comfortable living conditions at their residences.

##### **2.3.4.1 Causes of security lapses in on-campus SHFs**

According to Rodriguez *et al.* (2013: 47), security lapses in South Africa tertiary institutions encompass many factors such as poor access control to the campus and student housing, lack maintenance and security measures. Additionally, Du Toit (2015: 97) noted that security personnel performing multiple tasks and conflicting roles such as crime prevention, traffic regulation, access control and ensuring orderliness and stability on campus which often results in diversion of attention and limit their focus on their primary objective is one of the contributing factors to problems of security on South Africa campuses. Xaba (2006: 37) identified other risk factors such as absence of CCTV, broken doors and absence of burglar bars on many entrance doors, and poor lighting conditions at night. Other security lapses in SHFs are lack of access control with functional smart card at the main entrance and low security fencing around the campus (Rodriguez *et al.*, 2013: 49). Sass (2005: 9) commented on security gaps in South African university campuses as 24-hour protection is not visible in many SHFs.

##### **2.3.4.2 Risk/threat associated with lack of security measures in SHF**

Gopal and Niekerk (2018: 19) expands on free movement space on campus and student housing, which simply means students do not feel threatened particularly at night; this can be

achieved by ensuring adequate lighting at night for clear visibility. Whitehair *et al.* (2013: 53) stated in their study that students living in university residences such as Cape Flats that belongs to the University of the Western Cape adopt different strategies such as walking in groups at night while some students prefer to stay at home to keep safe from potential violence and attack. Similarly, Sass (2005: 28) stated that students experience more violence in off-campus residence compared with on-campus residences.

According to Hassanain (2008: 214), security lapses in SHFs open doors for theft, accident, injury and diverse kinds of criminal act on campuses. Prinsloo (2005: 8) further explains the issue of insecurity in South African SHFs owing to lack of security measures, safety awareness and safety signs which has led to high rate of injury and violence. Sass (2005: 8) elaborate on the need for security alarm systems and high fences in SA tertiary institutions and SHFs to safeguard students against threat from the outside and the violence within the institution.

Whether on-campus or off-campus, it is clear that lack of security measures contributes to violence, injury, theft and all forms of criminal act on campus and in the SHFs. Ultimately, there is a need for tertiary institutions in South Africa to improve on security measures to safe guard their campus infrastructure e.g. SHFs.

#### **2.3.4.3 Security measures required in SHFs**

Hassanain (2008a: 214), Rodriquez *et al.* (2013: 47) and Atkin and Brooks (2015: 94) identified the following as important security measures to be provided in the SHFs; close circuit television (CCTV), security guards on post, security alarms, access control with functional smart card, weapon detectors, fencing around the hostel, adequate lighting at night, security patrols around the hostels, emergency helpline, notice board, written policy prohibiting vandalism, emergency protocol poster on walls, security signs and security checkpoints at the entrance.

Similarly, Xaba (2006: 565) held that campus environment should be thoroughly monitored with surveillance cameras. Cerezo (2013: 222) stressed that numerous activities on campus makes it unrealistic for security personnel to monitor the entire campus environment including SHFs all alone. Accordingly, Close Circuit Television (CCTV) gives security personnel the ability to monitor different locations simultaneously and enables better control over campus activities. According to a ministerial report, it was generally agreed that institutions in SA must improve access control and make arrangements for the installation of video cameras that can monitor exits, lobbies, elevators and laundry rooms at student housing (Department of Higher Education and Training, 2011). Xaba (2006: 212) advocated efficient 24-hour campus

protection services, and patrols around both on- and off-campus residences mainly at night to monitor activities and transgressions.

### **2.3.5 Other/general safety measures**

Campus climate and the general condition of the campus environment contribute to student perceptions of safety and satisfaction, with a significant impact on their learning and living experience (Whitehair *et al.*, 2013: 194). Environmental factors and emergency management are considered as part of general safety measures that ought to be prioritised on campus (Cutter 2012: 521). Hassanain (2008a: 212) elaborated that in order for students to perform well academically, it is important that institution management ensures adequate provision of general safety measures on campus.

#### **2.3.5.1 Risk/threat associated with lack of other/general safety measures in SHFs**

Daily increase in waste generation and poor storage systems in university facilities which causes unsightliness, filthy environment, emanation of obnoxious odour and fly infestations on campuses have been perceived as an area of concern by environmentalists (Painter, Thondhlana and Kua, 2016: 491). Whitehair *et al.* (2013: 63) further explained that an increase in waste generation in student housing dining rooms and halls and insufficient waste storage facilities contribute to significant waste management problems which can jeopardise healthy living among students.

Aibor and Olorunda (2006: 214) pointed out noise pollution on campus as other aspect of risk. Dreossi and Momensohn-Santos (2005: 252) commented on the possible sources of noise pollution in an academic environment which often originates from inside of school, either from students in the lecture rooms or meeting hall, the use of power tools and machinery from ongoing construction or innovation around the campus and off-campus hostel. Oladokun and Ajayi (2019: 62) mentioned that facilities that are not in good condition can generate noise in the school environment e.g. old heating, ventilation and air conditioning (HVAC systems). Hassanain (2008a: 225) stress the importance of certain building components that can safeguard and provide a quiet environment suitable for the living requirement of students on campus such as construction of walls, floors, windows, and doors which must be designed with adequate insulation against environment noise.

Maxwell (2016: 207) emphasised that the impact of noise and its significant effect cannot be ignored in an academic environment. Noise pollution is one of the environmental factors that affects students' learning experience. Whitehair *et al.* (2013: 6) differentiated between noise and sound, and commented that though they are similar physical phenomena but they are not synonymous as noise can be classified as a type of sound but a sound cannot be necessarily



categorized as noise. According to Olorunda and Aibor (2002: 78), noise around student housing can cause annoyance, distraction, stress, headaches and tiredness; it can be acute when the period of exposure is short and manageable, and the effect could be temporary deafness or hearing loss; or chronic in terms of severity and long period of exposure. Oladokun and Ajayi (2019: 68) further explained the risk associated with prolonged exposure to very high noise levels in student housing with adverse effect such as irritation and mental stress. According to Balanay and Kearney (2015: 394), for protection against hearing loss among students, the location of student housing is an essential factor in campus settings. Husin, Nawawi, Ismail and Khalil (2018: 66) held that student housing should be isolated from any potential sources of noise such as traffic, construction sites, aircraft, industries and other human activities that can generate noise in order to ensure safety, comfort and well-being of the students.

Similarly, Wong and Lo (2007: 1837) argued that although student academic achievement is the top priority in education, several factors including the general look of campus environment, cleanliness, school climate, safety, and security can undermine this goal. Amsterdam (2013: 3) and Memon, Solangi and Abro (2018: 96) acknowledged that poor cleaning service can jeopardise student health and safety on campus.

Kincaid, Donovan and Pettitt (2005: 238) observed that students may sustain injury at their residences which often demands urgent attention before referral to the hospital hence there is a need for well-equipped and readily available and accessible First Aid box and well-trained health and safety personnel to handle emergencies on campus. Additionally, Chotipanich (2004: 364) perceived that many facility managers, first-aid personnel and health and safety officers lack health and safety training and safety awareness courses, which usually results in occupational health and safety lapses with significant effect on campus residents.

### **2.3.5.2 Other/general safety measures required in the SHFs**

The general safety measures required in on-campus SHFs are: first-aid box, 24 hours on-campus health clinic, emergency medically trained personnel, accident logs, waste bin facilities, barricades for any ongoing construction on campus, no open excavation around the hostel, hostel and campus environment free of stagnant water, lawn/grass maintenance and prevention of noise pollution on campus and around the hostel (Aibor and Olorunda, 2006: 212; Garcia, Lechner, Frerich, Lust, and Eisenberg 2014: 386; and Dhai and Mahomed 2018: 632). Atkin and Brooks (2015: 89) held that provision should be made for an accident report book in each of the facilities on campus with available and well trained personnel to record information from occupants and other users of the facility on accident related issues. According to Dhai and Mahomed (2018: 632), university members, both students and staff,

should have access to health and emergency facilities in the event of an emergency occurrence in accordance with the SA Occupational Health and Safety Act No. 85 of 1993. Xaba (2006: 214) and Atkin and Brooks (2015: 89) elaborated on the need for noticeboards on campus to ensure that health and safety policies are clearly displayed, together with the names of first-aiders, safety and security posters and emergency procedures properly placed on the noticeboard. According to Uline and Tschannen-Moran (2008: 58), cleanliness and neatness of buildings and entire campus environment are essential factors that promote and improve safety and health of students. Garcia *et al.* (2014: 387) stated that student living on campus disproportionately experience problems such as injuries and diverse kinds of illness requiring emergency medical attention. Thus, it becomes important to ensure the provision of a 24-hour health services in the SHFs.

From the preceding, five aspects of SHF safety measures are; fire safety measures, building safety measures, traffic safety measures, security measures and general/other safety measures (see Table 2.1).

Table 2.1 Summary of different measures required to guarantee safety in the SHFs (author's construction)

Fire safety measures	Building safety measures	Traffic safety measures	Security measures	General/other safety measures
Rodriguez <i>et al.</i> (2013: 47), Hassanain (2008: 214-215) Atkin and Brooks (2015: 94).	Olanrewaju <i>et al.</i> (2015: 85), Hassanain (2008: 214-215) and Rodrigue <i>et al.</i> (2013: 47).	Rathlagane <i>et al.</i> (2002: 24); Hatfield and Murphy (2007:198); Schwebel <i>et al.</i> (2012:267) and Rodrigue <i>et al.</i> (213:45).	Rodriguez <i>et al.</i> (2013: 47), Hassanain (2008: 214-215) and Atkin and Brooks (2015: 94).	Dhai and Mahomed (2018: 632); Garcia <i>et al.</i> (2014: 386) and Aibor and Olorunda (2006: 212).
<ul style="list-style-type: none"> <li>• Fire alarm,</li> <li>• Fire extinguisher ,</li> <li>• Emergency exit (escape doors),</li> <li>• Sprinkler system,</li> <li>• Smoke detector,</li> <li>• Fire hydrant,</li> <li>• Fire signage,</li> <li>• Fire assembly point,</li> <li>• Evacuation fire drills,</li> <li>• Rising main,</li> <li>• Reflux valve,</li> <li>• Fire hose reels,</li> <li>• Electrical outlets and switches,</li> <li>• Fire safety signs.</li> </ul>	<ul style="list-style-type: none"> <li>• Burglar bars on the windows,</li> <li>• Burglar bars on the doors,</li> <li>• Handrails on the stairs,</li> <li>• Tiles on the floor,</li> <li>• Escape/emergency doors,</li> <li>• Walls well plastered (no cracks),</li> <li>• Walls well painted,</li> <li>• Rooms well ventilated,</li> <li>• Lift for disabled students,</li> <li>• Covered outdoor water mains/manholes,</li> <li>• Covered indoor water mains/manholes,</li> <li>• Adequate lighting.</li> </ul>	<ul style="list-style-type: none"> <li>• Pedestrian walkways,</li> <li>• Pedestrian crossing signs,</li> <li>• Speed bumps,</li> <li>• Adequate parking space,</li> <li>• Guard for vehicle monitoring,</li> <li>• Vehicle access control,</li> <li>• Parking area for people with disabilities,</li> <li>• Traffic signs,</li> <li>• Traffic lights,</li> <li>• Street/Road lighting.</li> </ul>	<ul style="list-style-type: none"> <li>• Close circuit television (CCTV),</li> <li>• Security guard on post,</li> <li>• Security alarm,</li> <li>• Access control with functional smart card,</li> <li>• Weapon detector,</li> <li>• Fencing around the hostel</li> <li>• Adequate lighting at night,</li> <li>• Security patrol around the hostel,</li> <li>• Emergency help line,</li> <li>• Notice board,</li> <li>• Written policy prohibiting vandalism,</li> <li>• Emergency protocol poster on the wall,</li> <li>• Security signs,</li> <li>• Security checkpoint at the entrance.</li> </ul>	<ul style="list-style-type: none"> <li>• First-aid box,</li> <li>• On-campus health clinic,</li> <li>• Emergency medically trained personnel,</li> <li>• Accident log,</li> <li>• Waste bin facilities,</li> <li>• Barricades for any ongoing construction on campus,</li> <li>• No open excavation around the hostel,</li> <li>• Hostel and campus environment free of stagnant water,</li> <li>• Hostel and campus environment grass should be well cut,</li> <li>• Prevention of noise pollution on campus and around the hostel.</li> </ul>

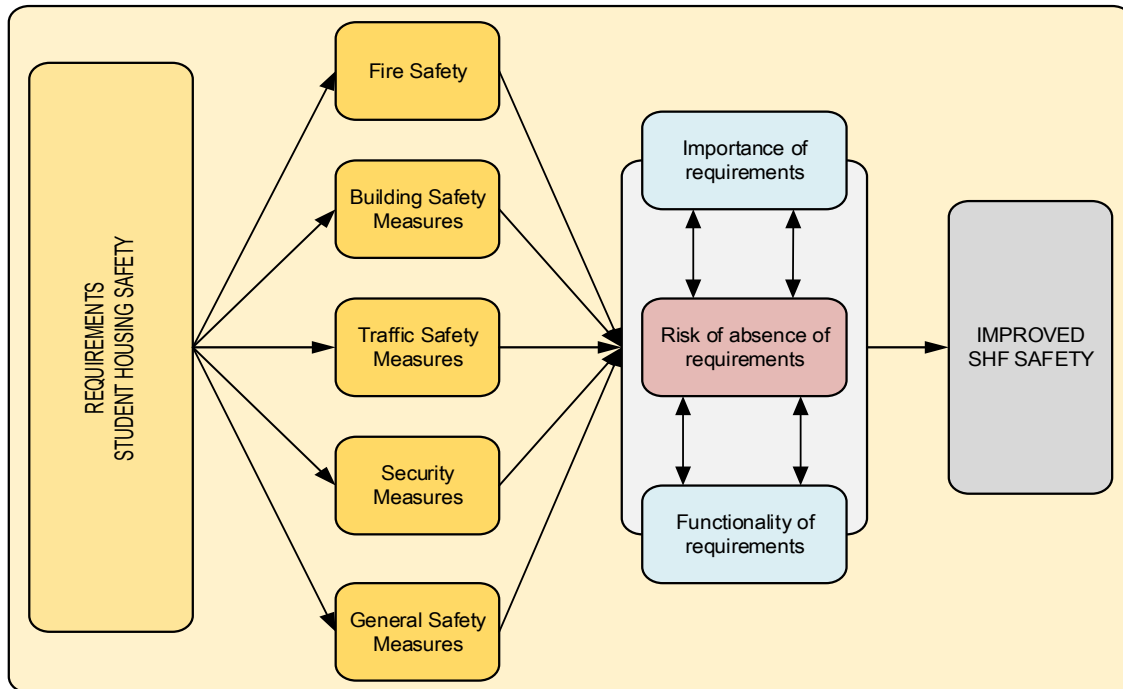


Figure 2.2: Conceptual framework to improve the safety of university student housing facilities

The five aspects of SHF safety measures are structured together to form a framework to guarantee safety in the on-campus SHFs. Any lapses in the level of provision and functionality of those measures could pose a deleterious risk to the building occupants (see Figure 2.2).

## 2.4 Chapter summary

The literature reveals that SHF is an integral component of the learning environment and as such, SHF is regarded as an essential physical infrastructure in every tertiary institution. The chapter stated the importance of safety and security measures in the SHFs. Different measures to guarantee safety in the SHFs were broadly discussed. The broader scope was further divided into individual variables such as fire safety measures, security measures, traffic safety measures, building safety measures and other/general safety measures required to ensure safety in the SHF. Also, risks associated with the lack of those measures in the on-campus residences were discussed. The literature also discovered the safety gap in the maintenance of university infrastructure such as SHF. The chapter further shed light on scope of FM and its contributions in the management of educational facilities such as SHF.

## CHAPTER THREE

### 3. Research methodology

#### 3.1 Introduction

This chapter explain the research methodology adopted for the study. The chapter provides a brief explanation of the research philosophy with clarity on philosophical and meta theoretical assumptions concerning the nature of 'reality' (ontology) and theoretical assumptions of what constitutes 'knowledge' (epistemology). The principles regulating scientific investigation (methodology) as well as the techniques or tools regarding the practical implementation of the study (research methods) are also discussed. In essence, the procedures required to meet the objectives of the study which are categorised into research philosophy, research methodology, data collection method, instrument for data collection, population of the study, sampling techniques and sample size, techniques adopted for data analysis, likewise, the validity and reliability of the research instrument are also presented. Furthermore, justifications for the choices made are provided in this chapter.

#### 3.2 Research philosophy

There are numerous reasons why understanding philosophical issues is important in research. Dudovskiy (2018: 1) commented that understanding the value of philosophy in human intellectual affairs play a vital role as it provides contingent fact about intellectual history. Also there may be confusion and instability in people's assumptions and ideas about the world, which makes the study of philosophy of special benefit (Padilla-Diaz 2015: 102). Tashakkori, Teddie and Biesta (2015: 96) held that the indirectness and circular nature of philosophical questioning in itself is helpful, as it often encourages in-depth thinking, and generates further questions in relation to the topic under consideration. Krauss (2005: 435) and Thomas, Buckland, Rexstad, Laake, Strindberg, Hedley, Bishop, Marques, and Burnham (2010: 13) stated that there are several fundamental terms used in the philosophy of science which specifies the relationships existing between investigator and the investigated object.

Chen, Shek and Bu (2011: 2) explained that any scientific inquiry is based on a particular paradigm, which can be defined as a worldview or a set of linked assumptions about the world. According to Scotland (2012: 10), a paradigm can also be described as a cognitive perspective or a set of shared beliefs to which a particular discipline adheres or obeys which can be traced to theoretical assumptions concerning the nature of 'reality' (ontology) and theoretical assumptions of what constitutes 'knowledge' (epistemology). According to Biggam (2015: 89), the philosophical stance of a research guides validate the researcher decision philosophically

and/or theoretically. Similarly, Kaya (2013: 311) stated that quantitative and qualitative approaches are derived from two different traditions of scientific philosophy. The fundamental difference between quantitative and qualitative (phenomenological) approaches lies in the issue of ontology and epistemology (Slevitch, 2011: 73). According to Ormston, Spencer, Barnard, and Snape (2014: 53), the quantitative approach stems from positivism, which has a realist orientation and is based on the idea of God's view or an independently existing reality that can be described as it really is while the qualitative tradition is based on interpretivism and constructivism, both of which stem from the idealist outlook (Kaya, 2013: 312). Vieira (2010: 83) stated that the major pillars of the philosophical stance of research are ontology and epistemology.

### **3.2.1 Ontology**

According to Scotland (2012: 9) ontology simply means one's view of reality or what exists. Padilla-Díaz (2015:102) held that ontology is the starting point which will likely lead to the researcher's theoretical framework. Arghode (2012: 116) further described ontology as the study of claims and assumptions that are made about the nature of social reality, claims about what exists, what it looks like, what units make it up and how these units interact with each other. Eyisi (2016: 92) asserts that in educational research, if someone studies ontology he or she studies what we mean when we say something exist which is the foundational truth about the intellectual areas of concerns. Similarly, Vaismoradi, Turunen and Bondas (2013: 398) clarified that if ontologists study what we mean when we say something exists, then an epistemologist studies what we mean when we say we know something (knowledge).

### **3.2.2 Epistemology**

Epistemology is the branch of philosophy concerned with the theory of knowledge (Roegman and Woulfin, 2019: 20). The epistemological philosophy attempts to understand whatever is most fundamentally understandable about the nature and availability of knowledge (Kaya, 2013: 311). According to Knight and Shum (2014: 24), epistemology focuses on the nature of knowledge, justification and the rationality of belief. According to Slevitch (2011: 74) epistemology addresses questions such as

- What makes justified beliefs justified?
- What does it mean to say that we know something?
- Fundamentally, how do we know that we know?

### **3.3 Research methodology**

Research methodology is a systematic process of collecting, analysing, and interpreting data with the aim of broadening the understanding of a situation of interest or concern (Leedy and Ormrod, 2014: 9). Research methodology offers strategies and direction for conducting a study. According to Punch (2005: 320), research methodology particularly explains why certain data was collected, what data was collected, where the data was collected, when the data was collected, how the data was collected and how the data will be analysed. The research methodology chosen for any research project is an important aspect, as it provides an overall framework for gathering and formulating the data required for the study. Furthermore, McCusker and Gunaydin (2015: 537) stressed that in choosing a research method for a study, the nature of the data intended to provide solutions to the problem has to be thoroughly considered. Leedy and Ormrod (2014: 10) emphasised the methodological approach is influenced by the type of data to be collected; hence a correlation needs to be established.

#### **3.3.1 Quantitative research method**

A quantitative research method employs the use of numerical data systematically and objectively from subgroup(s) selected out of a population to generalise the findings (Bryman, 2016: 4). According to Punch (2005: 320), quantitative research can also be interpreted as a research method that utilises quantification in the data collection and interpretation. Furthermore, it involves a theory-testing process to the relationship between theory and research, in which emphasis is placed on theory testing (Whitehair *et al.*, 2013: 6). The quantitative research method allows the researchers to diversify from the researcher's object of study as well as promote scientific objectivity (Poline, Breeze, Ghosh, Gorgolewski, Halchenko, Hanke, Haselgrove, Helmer, Keator, Marcus, Poldrack, Schwartz, Ashburner, and Kennedy, 2012: 12). The quantitative approach examines social problems by testing hypotheses. Its data usually contains variables measured in numbers and analysed with statistical formulas. In other words, quantitative studies mostly begin with a statement of the hypothesis which is to be tested and ends with a confirmation or disconfirmation of the hypothesis after it has been tested (Slevitch, 2011: 74).

Quantitative research approach includes research surveys, developmental design studies, correlation research studies, observation methods, experimental methods and ex post facto designs (Bryman, 2017: 58).

### **3.3.2 Qualitative research method**

A qualitative research approach provides researchers with tools to study complex phenomena in the areas of study (Hennink, *et al.*, 2010: 10). The approach is based on qualitative information in the form of words, sentences and narratives (Padilla-Díaz, 2015: 101). Hennink *et al.* (2010: 12) stressed that the qualitative research method covers a wide range of techniques and philosophy. Qualitative research gives a more in-depth understanding of a situation than the quantitative research method (Kleinsasser and Silverman, 2006: 56). Additionally, Padilla-Díaz (2015: 56) explained qualitative research as a disparity to, rather than an opposite of, the quantitative research method. It can be described as a method that emphasises words rather than estimation in the process of gathering and analysing data. Padilla-Díaz (2015: 102) indicated that qualitative research involves viewing the characteristics that cannot be easily reduced to numerical values. Arghode (2012: 155), further added that this kind of research method is mostly used when information is not too broad about a particular area of study and the variables are unknown, or in such a situation when the basis of an important theory is not sufficient. Hennink *et al.* (2010: 10) commented that qualitative approach provides an avenue for a close collaboration between the researcher and the participants, and also assists in gaining in-depth understandings of people, environment, their culture and factors affecting them through rigorous involvement in the reality of the study. Leedy and Ormrod (2014: 3) argue that the qualitative research method is experimental in nature and observations are usually explored in order to develop theories.

Qualitative research approaches include case study, ethnography, phenomenology, grounded theory, content analysis and historical research study (Leedy and Ormrod, 2014: 3).

### **3.3.3 Mixed research method**

Mixed research method is described as the combination of alternative approaches for instance using both qualitative and quantitative methods in a single research study to ensure a better understanding of the research challenges (Feilzer 2010: 7). Hennink *et al.* (2010: 8) elaborated that mixed method approaches are very wide and combine several research methods within or across paradigms with the aim of reducing the impact of personal bias and maximizing validity. Mixed method research promotes the gathering of different types of data and subsequent analysis with different techniques, which allows interpretations of the data in various ways. In choosing mixed method strategy for research study, consideration should be given to the research problem, research questions, and objectives of the study, as well as the skills of the researcher (Hennink *et al.*, 2010: 10).

The mixed research method provide opportunity for the following:



- Combination of qualitative and quantitative research methods within a single study.
- Direct focus on the link between approaches; viewing things from different perspectives (Feilzer, 2010: 6).

### **3.3.4 Research method for this study**

The use of mixed methods is employed for this study because the method allows close collaboration between the researcher and participants in terms of interviews, and it also gives room for data collection, in terms of questionnaires, to generalise the findings to the broader population. The method also allows a better opportunity to explore the research questions from different perspectives which leads to broader understanding of the issues identified in the research problem which are related to university SHF safety. The qualitative data was collected in two forms; by means of an interview with the university health, safety and environment officers (SHE Unit), and through observation by the researcher. The quantitative data was collected by means of questionnaires distributed to the students living in the university on-campus SHFs in the two universities in the Western Cape Province, South Africa.

## **3.4 Research strategy/approach**

There are several approaches that can be used to conduct research. The approach chosen for a research project usually depends on the nature of the data or information required and other conditions pertaining to the topic and the area of study (Leedy and Ormrod, 2014: 4). They include content analysis, phenomenological study, grounded theory study, ethnography, conceptual study, historical research, action research, exploratory studies, experimental studies, quasi-experimental studies, descriptive studies and case studies (Nieuwenhuis, 2007: 65; and Lewis, 2015: 473).

### **3.4.1 Content analysis**

According to Vanismoradi, Turunen and Bondas (2013: 398), content analysis is a research approach adopted to make replicable and valid inferences by interpreting and coding textual material, which can be attained by systematically evaluating documents, oral communication, video and audio, formats, pictures and graphics. Social scientists employ content analysis to examine patterns in communication in a systematic manner (qualitative data can be converted into quantitative data through content analysis) (Vaismoradi *et al.*, 2013: 399).

### **3.4.2 Phenomenological approach**

Palmer, Larkin, De Visser and Fadden, (2010: 99) described the phenomenological approach as the study of structures of consciousness as experienced from the first-person point of view.

Padilla-Díaz (2015: 102) further clarified that phenomenological study is the study of 'phenomena'; appearances of things as they appear in our experience, or the way we experience things.

### **3.4.3 Grounded theory approach**

This research approach concerns with theory information, which is grounded in data that has been systematically collected and analysed (Kleinsasser and Silverman, 2006: 136). Lumsdon and McGrath (2011: 265) stated that grounded theory is often used to uncover such things as social relationships and behaviours of groups, known as social processes.

### **3.4.4 Ethnography approach**

According to Creswell and Poth (2017: 26), the ethnographic approach was designed to explore cultural phenomena where the researcher observes society from the point of view of the subject of the study. Thus, ethnographic method is a systematic study of people and cultures.

### **3.4.5 Conceptual approach**

According to Borchert (2011: 117), the conceptual approach focuses on the concept or theory that explains or describes the phenomenon being studied. A conceptual researcher sits at his desk with pen in hand and tries to solve these problems by thinking about them (Borchert, 2011: 118).

### **3.4.6 Historical approach**

The historical research approach is the collection techniques and guidelines used by historians to conduct research and write histories of the past. Historical research approach applies to all field of study because it encompasses their origins, growth, theories, personalities and crisis (Reisigl, 2017: 44). Reisigl (2017: 44) further clarified that both qualitative and quantitative variables can be used in the collection of historical information.

### **3.4.7 Action research approach**

Borchert (2011: 118) described action research as an approach which is holistic in nature in problem-solving, rather than a single method for collecting and analysing data. Action research is either adopted to solve an immediate problem or a reflective process of progressive problem solving carried out as an individual research or in conjunctions with others, as a team to address problem under investigation (Somerville and Brown-Sica, 2011: 669).

### **3.4.8 Exploratory approach**

The focus of this approach is on exploring new knowledge. Palmer *et al.* (2010:99) stated that exploratory research is conducted for a problem that has not been studied more clearly, and it helps to develop operational definitions and improve the final research design.

### **3.4.9 Experimental approach**

Experimental research is mainly used for experiments research in order to test hypotheses (Borchert, 2011: 118). According to Kessner, Wiech, Forkmann, Ploner, and Bingel (2013: 1468), experimental approach is a collection of research designs which use manipulation and controlled testing to understand casual processes. Kessner *et al.* (2013: 1469) stressed that in experimental approach, one or more variables are manipulated to determine their effect on a dependent variable.

#### **3.4.9.1 Quasi-experimental approach**

This approach is similar to experimental research in that there is manipulation of an independent variable (Reisigl, 2017: 44). It is different from the experimental research approach because there is no control group, no random selection, no random assignment, and no active manipulation. It is useful when random selection cannot be performed (Palmer *et al.*, 2010: 99).

#### **3.4.10 Descriptive approach**

The descriptive approach is pretty much as it sounds, it describes situations. Doz (2011: 582) further explained that descriptive approach is based on description of reality, how things in reality are. The descriptive approach does not make accurate predictions and it does not determine cause and effect (Borchert, 2011: 118).

#### **3.4.11 Case study**

A case study approach is used to support arguments within a detailed study of a situation over a specific period of time (Doz 2011: 582). Flick (2015: 70) explained that a case study research can involve the study of a single case or a multiple cases. A case study focuses on a particular event in order to facilitate better understanding of unique or exceptional qualities to inform practice for similar events (Leedy and Ormrod, 2014: 6). The case study strategy makes use of both qualitative and quantitative techniques for gathering data (Nieuwenhuis, 2007: 75). A major weakness or limitations of the case study approach is that there is difficulty in generalising the findings from a particular case that has been studied to other cases, especially in a situation when just a single case is analysed (Leedy and Ormrod, 2014: 3).

However, a case study offers a multi-perspective analysis of a situation by making use of multiple sources and techniques for the data collection process, helping the researchers to acquire a better understanding of the dynamics of a situation (Khan, 2008: 6).

#### **3.4.12 Survey**

A survey is a research method used for collecting data from a pre-defined group of respondents to gain information and insights on various topics of interest (Reisigl, 2017: 45). A survey entails inquiring information from people through a questionnaire, which can be distributed as hard copy (in person) or soft copy (digitally) (Bryman, 2016: 5).

#### **3.4.13 Research strategy for this study**

A case study strategy was employed. Multiple cases were used in this study because it helped to compare the results from and within several campuses. The on-campus SHFs of two universities were used as the cases for this research study. This strategy helps in studying a social phenomenon through a thorough analysis of cases. Campbell and Ahrens (1998: 537) and Houghton and Keynes (2013: 13) emphasised that the multiple case study enables the researcher to explore differences within and between cases. Multiple case studies allow the researcher to analyse within each setting and across the settings. It also allows replications of findings across the cases by comparing, contrasting and predicting the result (Houghton and Keynes, 2013: 17).

### **3.5 Data collection method**

According to Leedy and Ormrod (2014: 2), the method used to collect data depends on the nature of the investigation and the type of information that is required and available. Data collection involves the exploration of diverse sources of information for the study. The data collected for a study consists mainly of the fieldwork also known as primary data, and literature also known as secondary data (Struwig and Stead, 2001: 40).

#### **3.5.1 Secondary data / literature review**

This is mainly a literature review to provide an overview of the research from various publications such as textbooks, articles, conference proceedings, dissertations, and journals, all of which form an extensive part of the literature on the research topic (Struwig and Stead, 2001: 41). Both qualitative and quantitative research make use of secondary sources of data.

Secondary data for this study was obtained from journal articles, textbooks, conference papers, SA Building Code and dissertations. Reisigl (2017: 46) posited that the review of relevant literature enables a researcher to explore evidence that has been gathered in a

research area and reveals an area that has not been researched properly. Consequently, literature was reviewed to develop a systematic and comprehensive view of the relevant literature on the topic.

### **3.5.2 Primary data collection method**

The literature was reviewed before the primary data was collected. This was done to reveal the facts that previous researchers had established about the research problem. According to Krauss (2005: 758), primary data is a new data acquired for the research study. Reisigl (2017: 45) defined primary data as information which is obtained at the point where it is produced. This method of data collection requires the researcher to ensure respondents understand the purpose and importance of the study (Kumar, 2011: 514). The primary data for this study was collected through interviews, questionnaire and observations.

#### **3.5.2.1 Interview**

Interviews for qualitative study are open-ended and semi-structured (Leedy and Ormrod, 2014: 4). A semi-structured interview was used for this study to allow the interviewer to probe the views and ideas of the interviewees. It also ensured that definite answers were obtained from definite questions, while allowing for the further development of the answers provided. Nieuwenhuis (2007: 49) affirmed that a semi-structured interview indeed allows for probing and clarifying answers. The respondents were first informed about the focus of the interview prior to the meeting, allowing them to adequately prepare for the interview in advance. The interviewees were the Safety, Health and Environment Officers from the two participant universities and the Fire Coordinators from university B. At university A, the officer in charge of the main campus from the SHE unit was interviewed. Whilst for university B, two representatives were presented for the interview; one safety officer and one fire coordinator. In the case one, the interview with the SHE officer at university A was conducted on 22nd February 2019, between the hours of 9:00 am and 9:58 am. In the other case, the interview with the safety officer and one fire coordinator at university B was conducted on Tuesday 5<sup>th</sup> March 2019 between the hours of 9:00am and 10:17am.

The interviews explored information on the measures put in place to generally promote safety on campus environment, and the measures required to guarantee safety in the SHFs, which shed light on the level of provision of those measures, importance of the measures and risk associated with absence of those measures. The interview further revealed the challenges encountered by the respondents that hindered effective implementation of safety strategies in the SHFs; likewise, the risk experienced or reported by students residing in the SHFs.

The interviews were recorded with Samsung Galaxy Z2 Tizen 4G. Thereafter, the researcher transcribed the data and delivered the printed copies to the interviewees for verification and adjustment in case of misinterpretation of information. The SHE officers made minor changes and the corrected information was collected back from the interviewee's office.

### **3.5.2.2 Questionnaire**

A questionnaire is the major technique used for quantitative studies and can be employed in mixed research method (Leedy and Ormrod, 2014: 2). According to Kumar (2011: 200), questionnaire design is one of the most essential aspects of a research survey. Kumar (2011: 201) further stressed that the key principle is to ensure validity of the research question by ensuring that there is correlation between the research objectives and research questions. For this study, the questionnaire was structured in accordance with the aim and objectives of the research study and the information gathered during literature review. The questionnaire was provided with options to allow participants to choose correctly, based on their opinions, and also to restrict respondents to select answers that had been generated in advance by the researcher (Feilzer, 2010: 15).

### **3.5.2.3 Questionnaire Structure**

The questionnaire for this study was arranged in sections. Each section was aimed at achieving a specific research objective. Table 3.1 described the questionnaire arrangement for the study. Section A consisted of participant's profile, section B probed the level of provision of security measures, fire safety measures, traffic safety measures, building safety measures and other general safety measures that are expected to be provided in an on-campus university SHF. Section C investigated the level of importance student attached to different measures to guarantee safety in the SHF. Section D assessed the level of risk/threat associated with the absence or lack of the different measures required to ensure safety in SHFs. Section E assessed students' level of satisfaction with the performance/functionality of safety and security measures provided at their university residences.

Table 3.1: Questionnaire design

Section	Section Title	Objectives to address
A	Profile of respondents	To determine the age, gender, level of study and number of years lived in the SHFs.
B	Level of provision of different measures required to guarantee safety in the SHFs.	Objective 1
C	Level of importance students attached to different measures to guarantee safety in the SHFs.	Objective 2
D	Level of risk/threat associated with the absence of the different measures required to ensure safety in the SHFs.	Objective 3
E	Student's level of satisfaction with the performance/functionality of different measures required to ensure safety in the SHFs.	Objective 4

#### 3.5.2.4 Observation

Observation is the act of careful looking often combined with other methods to provide useful data which helps to understand issues from different perspectives (Hennink *et al.*, 2010: 55). It helps to gain a deeper insight of what is being studied (Nieuwenhuis, 2007: 89). The researcher observed the conditions of SHF buildings; likewise, the safety and security measures provided in the SHFs for both universities.

### 3.6 Population

According to Reisi (2017: 44), a population is a group of people or items under consideration within a specific study area. Bryman (2016: 15) describes a population as a space of units from which a sample is selected.

#### 3.6.1 Population for this study

For this study, the population was the university safety, health and environment unit (SHE), and the totality of students residing in the on-campus SHFs which directly belongs to universities used as the cases.

### 3.7 Sampling technique

According to Flick (2015: 71), the sample of a study should be a minimised representation of the population in terms of representativeness of the variable. Whitehair *et al.* (2013: 5) further explained that the larger the sample in a research, the more representative and generalisable it is. A sample should be representative and be a sub-part of the entire population which has been selected to reveal the characteristics of the entire population (Jackson *et al.*, 2008:18).

Whitehair *et al.* (2013: 5) similarly added that the research sample must possess characteristics that allow findings to be generalised to the entire population. According to Flick (2015: 71), the sampling techniques are categorised into two techniques, probability sampling and non-probability sampling.

### **3.7.1 Probability sampling technique**

Probability sampling is a technique in which a sample of a larger population is chosen using a method based on the theory of probability (Whitehair *et al.*, 2013: 5). According to Flick (2015: 71), for a participant to be considered for a probability sample, he/she must be selected using random selection. Probability sampling techniques include simple random sampling, systematic sampling and stratified sampling.

#### **3.7.1.1 Simple random sampling**

The term 'random' has a very precise meaning: one cannot just collect responses on the street and have a random sample (Whitehair *et al.*, 2013: 6). Flick (2015: 72) stated that simple random sampling is a sampling technique where every item in the population has an even chance of being selected in the sample; the selection of items (samples) completely depends on chance or by probability and therefore this sampling technique is also sometimes known as a method of chance. (Whitehair *et al.*, 2013: 4) asserted that in random sampling, effort is made to ensure that each member of the population has an equal chance of being selected.

#### **3.7.1.2 Systematic sampling**

In a systematic sample, after researchers have decided the sample size, the elements of the population are then arranged in some order and respondents are selected at regular intervals from the list. Advantage of using systematic sampling over simple random sampling is its simplicity and assurance that the population will be evenly sampled (Reisigl, 2017: 44).

#### **3.7.1.3 Stratified sampling**

Stratified sampling is a method of sampling that involves the division of a population into smaller sub-groups known as strata (Ngulube and Magazi, 2013 :6). In a stratified sampling, the researcher usually divides a population into characteristics of importance for the research and tries to create the statistical features of the population on a smaller scale; thereafter, the researcher embarks on sampling (Flick 2015: 71).



### **3.7.2 Non probability sampling technique**

Non-probability sampling is a sampling technique in which samples are gathered in a process that does not give all the individuals in the population equal chances of being selected (Tansey, 2009: 768). Non-probability sampling technique include convenience sampling, snowball sampling, quota sampling and purposive/ judgmental sampling

#### **3.7.2.1 Convenience sampling**

Convenience sampling, also known as accidental sampling, is a type of sampling based on availability and convenience of people. However, proximity and accessibility of the researcher to such a population should be taken into consideration (Leedy and Ormrod, 2014: 2).

#### **3.7.2.2 Snow-ball sampling**

In this method, the researcher relies on his or her initial respondents to refer him or her to the next respondent. According to Bryman (2017: 58), the sample gathered in this manner grows in size as researcher moves through the process of conducting a survey.

#### **3.7.2.3 Quota sampling**

This is a non-probability sampling method in which the researcher characterises the population based on desired features (Eyisi, 2016: 92). Leedy and Ormrod (2014: 2) explained that in quota sampling, the researcher must first divide the targeted sample into sub-groups before a representative sample is choose from all the groups. As opposed to random sampling, quota sampling requires that representative individuals are chosen out of a specific subgroup. For example, a researcher might ask for a sample of 100 females, or 100 individuals between the ages of 20-30 (Eyisi, 2016: 93). Tansey (2009: 65) stressed the importance of using quota sampling techniques which include a high level of degree of representativeness of all the strata in the population, it reveals representatives' opinions across the sub-groups in a population, avoids selection bias and is suitable when sampling a larger population.

#### **3.7.2.4 Purposive method**

In purposive sampling, the researcher chooses people or other units for a specific purpose (Lewis, 2015: 474). Purposive sampling can be used to select a target group from the entire population.

### **3.8 Sampling technique for this study**

There are seven on-campus university SHFs at university A, though some of these residences are divided into two. Although there are more residences at university B, only the seven SHFs

owned and managed by the university were included in the survey. All the on-campus SHFs which directly belong to both universities were included in the study. A quota sampling technique was adopted in this study. Quota sampling gives room for equity of sample representation and ensures that each member of the population has as much chance as any other of being included in the sample (Eyisi, 2016: 92). The specific sub-group in this study are on-campus university residences, from which equal sample sizes were selected depending on the size of the residence and population. Singh and Masuku (2014: 6) commented that the + or -10% margin error formula is suitable in quota sampling. This technique was adopted to avoid being biased and to achieve equity in respondents' opinions regarding safety and security measures at their residences. The selection was done to reveal students' perspectives about their residences. Thereafter, convenience sampling was adopted to distribute the questionnaire to the students. Convenience sampling is a type of sampling based on availability and convenience of people (Leedy and Ormrod, 2014: 2).

### **3.9 Criteria for good sample size**

In addition to the aim of the study and population size, three criteria are needed to determine the appropriate sample size, which include the precision level, the confidence level and the variability degree (Singh and Masuku, 2014: 9). These criteria are briefly discussed below.

#### **3.9.1 Precision level**

Precision level, sometimes refers to sampling error, is the range in which the true value of the population is estimated to all. This range is usually expressed in percentage points (e.g.,  $\pm 5$  percent). For instance, if a researcher discovers that 60% of institutions in the sample have adopted a recommended training with a precision rate of  $\pm 5\%$ , then the researcher can conclude that between 55% and 65% of institutions in the population have adopted the training (Schonbrodt and Perugini, 2013: 609).

#### **3.9.2 Confidence level**

Confidence level, also known as risk level, is based on the ideas of the central limit theorem. The main idea in the central limit theorem is that when a population is repeatedly sampled, the average value of the attribute obtained by those samples is equal to the true population value. However, there is a risk or probability that the sample acquired by the researchers or investigators might not often denote the true population value and consequently lower levels of confidence (Singh and Masuku, 2014: 10).

### 3.9.3 Variability degree

The variability degree refers to the dissemination of attributes in the population under investigation. The variables in a more homogeneous population require a smaller sample size. The more heterogeneous the population, the larger the sample size required in order to obtain a given level of precision (Singh and Masuku, 2014: 50).

### 3.10 Strategies for Determining Reliable Sample Size

There are three significant approaches to determining the sample size. These include:

- ✦ The use of census for small populations: this is one of the approaches that researchers adopt in sampling a small population; the target is to use the entire population as the sample. However, cost consideration, time impediments and insufficient resources may hinder this approach and make it impossible for a large population. The census approach is more useful and attractive for a small population of 150 to 200 or less in order to attain a desirable level of precision (Singh and Masuku, 2014: 10).
- ✦ Duplicating a sample size of similar studies: this is another approach for determining sample size, the idea being to make use of the same sample size as those of studies similar to the research plan and focus. However, the risk of repeating errors that were made by previous researcher is inevitable (Beleites, *et al.*, 2013: 25).
- ✦ Using published tables, and also applying formulas to calculate a sample size: this is more reliable approach because it makes provision for the precision level, confidence level and degree of variability (Singh and Masuku, 2014: 10).

Below is how to use Published Table for sample size as presented by (Singh and Masuku, 2014: 11). Note that sample sizes in the table below reflects the number of completed and returned responses and not necessarily the number of surveys or questionnaires distributed or interviews conducted.

Using Published Table Sample Size for  $\pm 3\%$ ,  $\pm 5\%$ ,  $\pm 7\%$  and  $\pm 10\%$  Precision Levels where Confidence Level is 95% and  $P = 0.5$  (Israel, 1992:03; Singh and Masuku, 2014:10).

Table 3.2: Published table sample size for + or - 3%, + or - 5%, + or - 7% and + or - 10%

Size of population	Sample Size (n) for Precision (e)			
	$\pm 3\%$	$\pm 5\%$	$\pm 7\%$	$\pm 10\%$
500	a	222	145	83
600	a	240	152	86
700	a	255	158	88
800	a	267	163	89
900	a	277	166	90
1000	a	286	169	91
2,000	714	333	185	95
3,000	811	353	191	97
4,000	870	364	194	98
5,000	909	370	196	98
6,000	938	375	197	98
7,000	959	378	198	99
8,000	976	381	199	99
9,000	989	383	200	99
10,000	1,000	385	200	99
15,000	1,034	390	201	99
20,000	1,053	392	204	100
25,000	1,064	394	204	100
50,000	1,087	397	204	100
100,000	1,099	398	204	100
> 100,000	1,111	400	204	100

As presented in the Table 3.2 above, Singh and Masuku (2014: 3) explain that to determine the size of sample needed for the survey to be valid and to ensure that survey is big enough to be reliable or statically significant, it is essential to use sample size calculator. The researcher must first calculate and know the population size which is the total number of people he or she is trying to study and apply a margin error principle range. For example, if total population is assumed to be 1000 with  $\pm 3\%$  margin error, there should be 345 respondents; for 1000 with  $\pm 5\%$  margin error, 286 respondents would be required; for 1000 with  $\pm 7\%$  margin error, 169 respondent would be required; for 1000 with  $\pm 10\%$  margin error, 91 respondents would be required. The margin error can be relatively low as  $\pm 3\%$  or as high as  $\pm 10\%$  depending on the size of population and researcher's decision.

### 3.11 Sample size for this study

The use of  $\pm 7\%$  sample size as described by Singh and Masuku (2014: 14) was adopted in this study with the aim of achieving a reliable and manageable sample size with 0.5 precision level as presented in the Table 3.2 above.

A  $\pm 7\%$  margin error was adopted for this study to determine the number of respondents needed out of the total population of students residing in each SHF. The on-campus SHFs included in the study varies from 100 to 200 bed capacity from which a manageable number of respondents was sampled. A total number of 460 questionnaires was distributed to residents in both institutions, 338 questionnaires were properly completed which represents 73.5%.

### **3.12 Scale of measurement**

Scale of measurement is a classification that describes the nature of information within the value assigned to variables. It can also be viewed as the method by means of which variables are interpreted and categorised. Each measurement scale is crucial in determining the statistical process to be employed for the statistical analysis of a study (Lewis, 2015: 475). Leedy and Ormrod (2014: 248) discussed four basic measurement scales presented in the subsequent subsections below.

#### **3.12.1 Nominal Scale**

This is a measurement scale in which numbers serve as 'tag' or 'label' only to identify or classify an object. A nominal scale measurement normally deals with non-numeric (quantitative) variables or where numbers have no value. During statistical analysis, it allows one to ascertain the mode and percentage values.

#### **3.12.2 Ordinal Scale**

An ordinal measurement scale is a rank order scale. i.e. lesser or greater, smaller or larger. Measurable quantities are not represented by ordinal scales. This measurement scale allows the determination of the median, percentile and rank correlation.

#### **3.12.3 Interval Scale**

This measurement scale represents quantities that have equal intervals, the differences between points on the scale are measurable and exactly equal but whose zero point depicts an additional measurement point. The interval measurement scale allows the establishment of the mean, standard deviation and enables one to perform most statistical inferential analysis.

### 3.12.4 Ratio Scale

This measurement scale is similar to the interval scale. This scale has an origin point of zero absolute. It allows one to ascertain the geometric mean and percentile variation and enables one to perform all types of inferential statistical analysis.

### 3.13 Data analysis

Data analysis deals with the examination, testing, tabulation, and categorisation of evidence to address the foremost proposition of a study (Zhang, Chen, Mao, Hu, and Leung, 2014: 52). During the data analysis process, data gathered are examined to address the research questions or hypotheses (Tashakkori *et al.*, 2015: 25). Data analysis is usually carried out in order to determine the direction of the research (Nieuwenhuis, 2007: 7). Technique involves pattern matching, explanation building, time-series analysis, logic models, and cross-case synthesis can be used for analysing a case study (Zhang *et al.*, 2014: 51). Quantitative analysis involves a statistical operation to discover and describe patterns of data (Poline *et al.*, 2012: 9). For this study, quantitative data was analysed using the Statistical Package for Social Sciences (SPSS) version 25 whilst thematic analysis was used for the qualitative data. Both descriptive and inferential statistics are used. See Figure 3.1 and Figure 3.2 below.

#### 3.13.1 Descriptive statistics

According to Vaismoradi *et al.* (2013: 398), descriptive statistics provide statistical summaries of data. Naoum and Campbell (2008: 7) and Leedy and Ormrod (2011: 4) described descriptive statistics as the act of summarising quantitative data collected in a study in an arranged sequence. Hennink *et al.* (2010: 23) stated that descriptive statistics describe the variables in the study with the use of mean value and respective percentage of respondents. Descriptive statistics is the simplest method of analysing information gathered and gives a broad overview of results (Tansey, 2019: 764). This is the simplest method of analysing data which provides a general overview of the result and provides a coherent and straightforward picture of a large amount of data (Whitehair *et al.*, 2013: 5). The purpose of this statistical tool is to provide an overview of a large amount of data (Hennink *et al.*, 2010: 23). Frequency distribution, measurement of central tendency and measurement of dispersion are three formal terms frequently used in descriptive statistics (Leedy and Ormrod, 2014: 4).

Leedy and Ormrod (2014: 35) further commented that:

- Frequency distribution involves the use of tables to narrate various outcomes in a sample.

- Measure of central tendency involves the arrangement of numbers from smallest to largest or vice versa, which is useful in calculating the mean score. Hennink *et al.* (2010: 206) explained that a measure of central tendency is a major value on a scale of measurement that denotes the location of a set of scores.
- Measure of dispersion involves measurement of variability, scatter or how value spread across variables. This is achieved with standard deviation.

For the purpose of this study, descriptive statistics adopted are frequency distribution and measurement of central tendency (mean and standard deviation). This process consists of using methods for calculating numerical descriptions of the data (Leedy and Ormrod, 2014: 4).

### **3.13.2 Inferential statistics**

Inferential statistics use examples of observations to determine observations found in a study (Lewis, 2015: 473). This method of data analysis provides room for researchers to generalise the results gathered from a population within a given error margin (Hollis, 2010: 210). This helps in generalising the findings from the sample to the larger population. Inferential statistics includes statistics such as parametric and non-parametric (Vaismoradi *et al.*, 2013: 398).

In addition to descriptive analysis, the use of inferential statistics 'analysis of variance test' was also adopted in this study. This was used to analyse the differences among group mean scores in the sample collected from both universities.

### **3.14 Validity and reliability of data**

Validity and reliability are represented in different forms based on the nature of the research problem (Leedy and Ormrod, 2014: 2). Research instruments are tested for validity and reliability to show evidence that the instruments fulfil their purpose of design and consistency in findings when used (Hollis, 2010: 210). Silverman (2011: 21) explained that validity and reliability are important because they determine the credibility and objectivity of any research study.

#### **3.14.1 Validity**

Research validity means the correctness or credibility of the research findings (Whitehair *et al.*, 2013: 5). In other words, it relates to the extent to which the instrument measures what it is meant to measure (Leedy and Ormrod, 2014: 6). Feilzer (2010:14) pointed out that validity could be addressed by the use of triangulation, respondent validation and grounded data. Construct validity, internal validity and external validity are important element when considering validity of data (Hajrasouliha, 2017: 170).

For this study triangulation is used to collect data. To ensure respondent validation, the interviews were transcribed. The data was then given to the respondent to check and resolve any disagreements that may have arisen, eliminating interviewer misunderstanding or bias. Also, questionnaires were tested for content validity by first issuing them out for piloting.

### **3.14.2 Reliability**

Struwig and Stead (2001: 130) defined reliability as the point to which test scores prove to be accurate, stable and consistent. Kumar (2011: 515) explained that the degree of reliability becomes high if instruments used for measuring are accurate and consistent. Whitehair *et al.* (2013: 6) emphasised that a score derived from a test is reliable to the degree that repeated measurements carried out by it under stable and consistent conditions provide equal or similar results. Reliability is aimed at minimising errors in a study (Houghton and Keynes, 2013: 13). Additionally, Bryman (2016: 15) held that reliability deals with the question of how repeatable or consistent the results of a study are. The reliability of the instrument and Likert scale questions used for this study was tested with Cronbach's alpha coefficient test. There are three key factors to be considered when measuring the reliability of research conducted as subsequently discussed in the subsections below.

#### **3.14.2.1 Stability**

This is the quality of being firm and free from change or variation. It deals with confirming the stability of a measure over a period of time, so there will be confidence in the results obtained, and ensuring there is no fluctuation in the measure for a sample of respondents (Silverman, 2013: 21).

#### **3.14.2.2 Internal reliability**

This deals with the consistency of the indicators that formulate the scale or index. It requires assuring that the scores of respondents on any of the indicators are related to their scores on alternative indicators (Bryman, 2016: 15).

#### **3.14.2.3 Inter-observer consistency**

Kaya (2013: 312) explain that inner consistency can be tested with Kuder-Richardson formula 20 (KR-20), Cronbach's alpha coefficient, split half techniques or factor analysis. To ensure reliability of this study, the Cronbach's alpha coefficient was used in testing the consistency of the data gathered. According to Bryman (2016: 14) the average of all viable split-half coefficients are importantly calculated with Cronbach's alpha coefficient. Variation of the alpha coefficient will be between 1 (indicating perfect internal reliability) and 0 (representing no



internal reliability, The figure 0.80 was used as a rule of thumb to represent a sustainable level of internal reliability (Nieuwenhuis, 2007: 71).

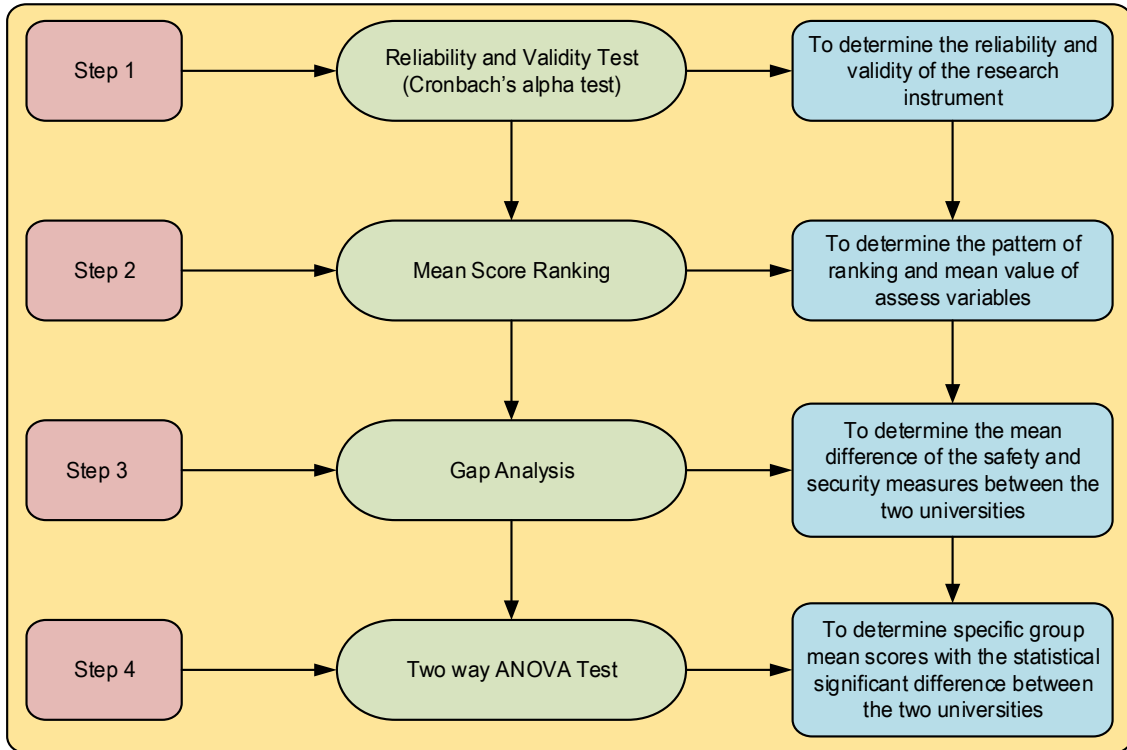


Figure 3.1: Four step data analysis framework for this study

### 3.15 Chapter summary

This chapter provided an overview of the research methodology of this study. A mixed research method was adopted to achieve the aim and objectives. A case study and survey approach were adopted for the study. Observation and interview were carried out by the researcher, closed-ended questionnaires were also administered to students residing in the on-campus SHFs. The reliability of scaled questions was tested with Cronbach's alpha test. The data gathered was analysed using descriptive and inferential statistics. Findings from the questionnaire survey, interview and observation are analysed and discussed in the next chapter. Figure 3.1 presents the research methodology approach adopted for this study.

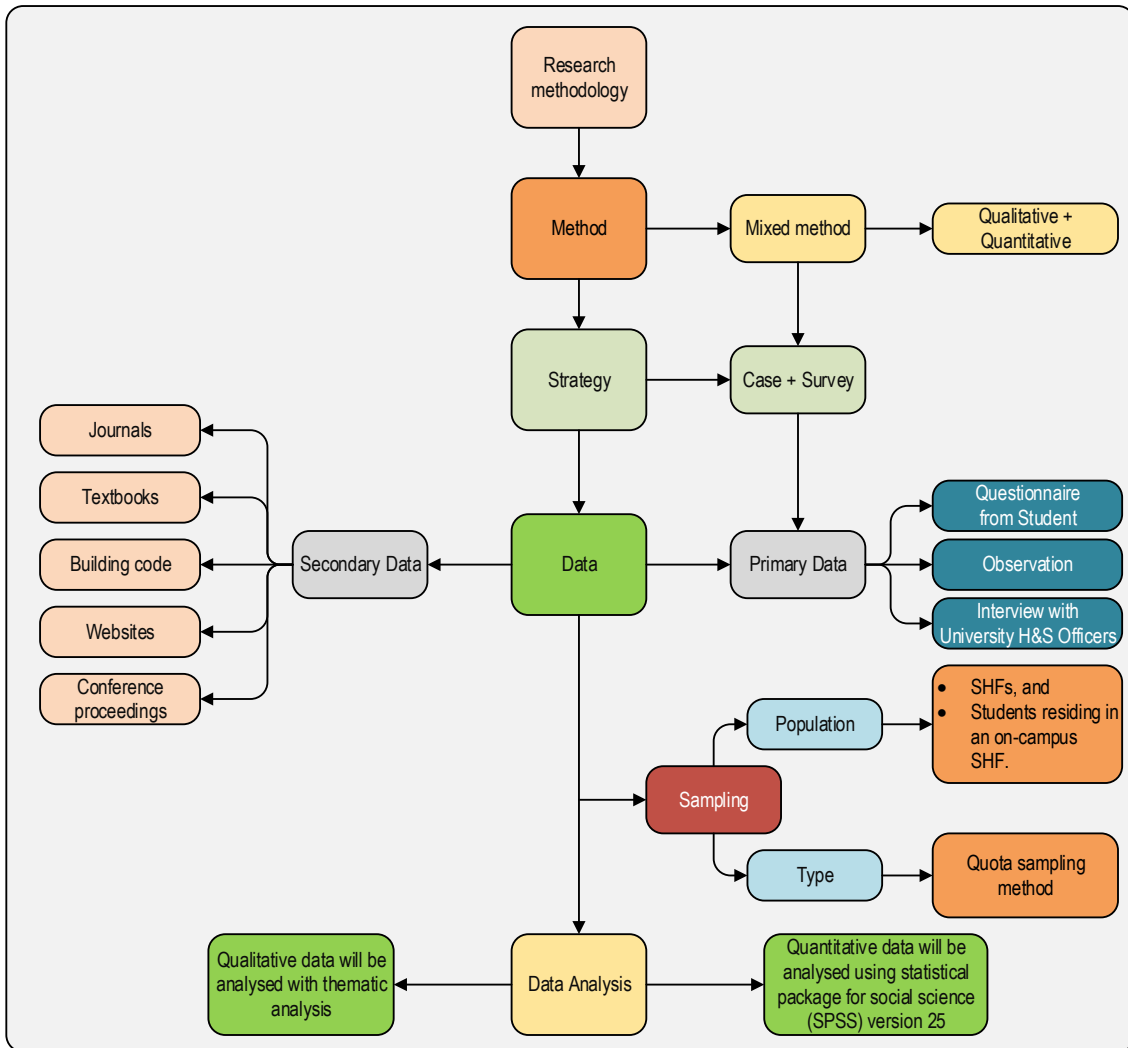


Figure 3.2: Illustration of the research methodology

## **CHAPTER FOUR**

### **4. Data analysis and discussion**

#### **4.1 Introduction**

This chapter presents the analysis and discussions of the data collected by means of observation, interview and questionnaire. The study cases and results derived from the analysis of the two universities are presented separately. The analysis covers the result of data collected on the different measures put in place to guarantee safety in the on-campus SHFs. Moreover, the chapter describes the reliability test of the Likert scale questions. The two universities are presented as university A and university B respectively.

#### **4.2 Data analysis for university A**

##### **4.2.1 Description of university A**

University A is the largest higher education institution in the Western Cape Province of South Africa and the only university of technology in the province. There are eight on-campus university SHFs located within the boundary of the university (Bellville campus). However, the study covers seven SHFs due to the fact that one of the residences was under renovation at the time this study was conducted. The majority of SHFs at university A are more than 20 years old. University A has only one new SHF, a multi-storey building with 200 bed capacity, constructed in 2011. All the on-campus SHFs are owned and managed by the university and were included in the survey, except the one which was being renovated.

#### **4.3 Observation of university A**

The condition of the SHFs were observed with the aim of identifying safety measures that are provided across the university SHFs. Observations were made to complement the data provided by the students, as well as information gathered from the university safety, health and environment officers (SHE unit). This process helped to establish the facts surrounding the safety issues in the SHFs from different perspectives and to gain deeper insight of what has been studied. Observations were carried out for the period of one week: Monday 15<sup>th</sup> April – Friday 19<sup>th</sup> April 2019. This was possible after a permission letter was granted to the researcher to conduct research in the university owned SHFs.

### **4.3.1 The results of the observations**

#### **4.3.1.1 General overview**

The SHFs are built with bricks, the interior walls are plastered and painted. The majority of SHFs are multi-storey buildings and bed capacity varies from 75 to 200 beds. The SHFs at university A appears very stable structurally though there is evidence of few cracks in the interior walls and damaged ceiling at the second floor in some of these residences. SHFs at the university do not have specific fencing, although they were built within the campus boundary in enclosed spaces.

#### **4.3.1.2 Security measures**

The observations showed that the majority of the SHFs lack CCTV, fencing around the hostel, electronic coded locks on the doors and weapon detectors at security checkpoints to the residence. Additionally, it was observed that while lighting was provided across the residences, the surroundings were sometimes dark at night due to inadequate lighting on campus especially where student residences were located. The area of concern during the observation was the security guards at the entrance of SHFs. It was observed that security guards contribute to poor access control in the SHFs due to their inability to stay on post. The majority of the SHFs at the university have security gate but not controlled with functional smart card which allows strangers to gain free access to the SHFs. Only four residences were using biometric identification at the time of observation.

#### **4.3.1.3 Fire safety measures**

The majority of residences at university A are allocated with fire extinguishers. However, observation showed that fire extinguishers were left lying on the floors and placed behind the doors instead of mounting them on the wall. Only a few residences maintained their fire extinguishers properly. It was observed that fire alarms, smoke detectors and fire safety signs were not adequately provided, while some were damaged. However, it was observed that fire safety measures such as fire hose reels, fire hydrants, fire assembly point and electrical outlets and switches are well provided in the SHFs. Fire safety measures that are not provided across the residences include; water sprinklers, and emergency helpline and emergency protocol posters on the wall.

#### **4.3.1.4 Traffic safety measures**

It was observed that campus roads that lead to/around the SHFs are safe for motorists. Safety measures such as traffic signs, drop off/pick up zone, parking for people with disabilities and

speed bumps were well provided. However, observations revealed that traffic safety measures which include pedestrian crossing to the SHFs and vehicle access control at the main entrance to the campus were poorly provided. Furthermore, guards to monitor vehicles, tags for vehicles and traffic lights were also not evident on campus.

#### **4.3.1.5 Building safety measures**

It was observed that the majority of the SHFs at university A appears structurally stable and have burglar bars on the windows at the ground floor only. Interior walls were well plastered and painted. In addition, outdoor and indoor drainage manholes were well covered. The main point of concern in relation to building safety measures include; lack of lifts for disabled students, evidence of cracks in the walls of the majority of the older buildings, absence of disabled toilet facilities in some residences, and leaking showers which might result in falling, slipping and other accidents in the SHFs.

#### **4.3.1.6 Other/general safety measures**

The observations revealed that on-campus health clinic, waste bin facilities, cleaning around the SHFs and lawn maintenance were provided. The observations also showed that improvement is needed to be made in the provision of first-aid boxes, accident logs and personnel trained in first aid to handle emergencies in the SHFs.

### **4.4 Interview**

#### **4.4.1 General safety measures on campus and in the SHFs**

The SHE officer stated that she would prefer to speak on safety measurements in the SHFs first and from there speak on safety measures on the campus environment. She stated that the Safety Unit ensured that the resident coordinators were given basic health and safety training and as such act as health and safety representatives for the students in the SHFs. She further stated that residence coordinators were trained as first-aiders at level two to three, depending on how they participate in the training.

As part of safety measures, it is expected of the residence coordinator to carry out a personal interview with registered students of the residence, who are willing to be trained on the use of first-aid and fire extinguishers during any emergency situations. She stated that the purpose for this was to create a safety team together with the resident coordinator to assist during the evening when safety officers were off-campus. She clarified that the intention was to ensure that the team could help to activate the emergency evacuation plan, and then ensure that the students get out and assemble at the assembly point. This officer revealed the risk associated

with the effectiveness in the case of emergency at night. In terms of emergency evacuation plans, there is an expected drill in which the resident coordinator informs the students through the house parent of a pending emergency evacuation, and there are drills without warning.

In terms of medical safety for students living on campus, the SHE unit has realised the need for an emergency after-hours service, should something happen after hours, in which case the residence parent must call emergency rescue services (ER) to assist the student. Although this was not part of their plans since been implemented in the residence because of the challenges confronting the students.

#### **4.4.2 Security measures put in place in the SHFs**

In terms of security measures in the residence, at the time of the interview the safety officer pointed out that there are CCTV cameras in some of the SHFs only. None of the CCTV in the SHFs were functioning well at the time due to the fact that the CCTV control room had been vandalised during the #FeesMustFall protest, however, it was currently under renovation.

In terms of access control with functional smart card to the residence, the safety officer indicated that in the postgraduate SHF, there was nothing like smart card access control nor security gates. The officer further stated that most of the undergraduate SHFs had biometric system, although not all were working, which was another area where improvement was needed. The respondent revealed that security guards are expected to be on duty 24 hours a day, otherwise, a defaulting security guard would be reported to the security supervisor.

In terms of written policy prohibiting vandalism in the SHFs, the safety officer clarified that there were rule books for the students. In terms of security patrol around the SHFs especially at night, the officer stated that it was expected that the security supervisor(s) would do hourly checks as well as campus security patrol.

Regarding electronic locks on the hostel doors, the officer stated that 'this can only be found at the postgraduate residence at the moment; however, students are expected to use padlocks. In terms of lighting at night in and around the hostel, the officer explained that this could be challenging sometimes because some lights were not maintained. She explained that campus required adequate lighting at night, especially in the immediate surroundings of the SHFs. Lastly, there was no specific fencing around all the SHFs, though there was a major fence that ran along the campus boundary. She pointed that though the main entrance gates were controlled, the exit at the rear side of the campus did not have CCTV and security guards to monitor all the times. This could pose high level of risk to students and as such requires necessary improvement.

#### **4.4.3 Fire safety measures put in place in the SHFs**

In terms of fire safety in the SHFs, the respondent explained that provision was made for portable alarms, and loud hailers to raise the alarm in case of fire events in the SHFs. However, some of the fire alarms were not functioning because the whole control room had been vandalised and burnt down by the students during the #FeesMustFall protest. She explained that one of the SHFs still had a control board, though, there was no guarantee that it would work since the modem board had been vandalised in the general control room.

The officer mentioned that safety training for the entire students in the residence was part of the safety measures. She stated that there was health and safety orientation for all first-year students whether they were to live in the university residence or not. It was the responsibility of the house parent to continuously address the safety issues in the residence after safety training had been completed. She could not give an account of how often the house parents did that, but they normally reported if there was a safety issues in the residence. There was a residence safety committee, where all residence/house parents gathered and safety officers advised them on how to improve the safety measures in the SHFs but for the last 3-4 years, that committee had not met consistently. However, it was being re-established.

In terms of provision of fire extinguishers in SHFs, the safety officer explained that, an external service provider was in charge of maintaining fire extinguishers and there was fire hose reel. In residence kitchens, provision was made for fire blankets and electronic fire alarms. Other fire safety measures provided in the residence are: fire assembly points, and fire hydrants which were serviced annually, though during the drought in Cape Town in 2017-18, the pressure was affected.

The officer indicated that there were smoke detectors and water sprinkler systems on academic buildings but not in the residences. There was no emergency helpline in case of event of fire, rape or theft. The respondent acknowledged that some institutions do have emergency helpline (telephone) in which students can just press for immediate assistance which is also lacking presently. However, she stated that 'there are provision for the names and contact numbers of the personnel to contact in case of any emergency situations, and there are security guards in the SHFs'.

The safety officer pointed out another area of challenge, which was the safety inspection in the SHFs. She clarified that safety inspection was not frequent as it should to be, because only one SHE officer was allocated to the entire campus. The respondent also affirmed that the shortage of safety officers hindered the safety inspection of the residence. She gave an

indication that only one fire marshal allocated to the residence, and mentioned that the SHFs lacked a fire warden.

#### **4.4.4 Traffic safety measures put in place in an on-campus SHFs**

In terms of road safety measures for the on-campus SHFs, the respondent stated that there was provision for pedestrian crossings and speed bumps though not enough presently. The officer explained that there were normal stop signs and campus roads were painted such that motorists and pedestrians could see, walk and drive safely. Some campus motorists do not adhere to the designated speed limit on campus roads. This is a huge problem during weekends, most especially, when the students are out having funs and get intoxicated. The officer also commented that parking spaces were provided in the SHFs, but limited number of guards are available to monitor vehicles. She further commented on traffic lights on campus by pointing out that traffic lights could only be needed during graduation period.

#### **4.4.5 Building safety measures put in place in the SHFs**

In terms of building safety measures, the officer stated that burglar bars on the windows are well provided in the SHFs mainly on the ground floors. Burglar bars are not evident on the residence doors, though student rooms have padlocks to lock them. The safety officer further clarified that other areas of concern with potential risks on the occupants were cracks in some of the residences. It was mentioned that there is evidence of damp in the walls as well as the ceilings. The respondent pointed out that students also complained of leaking showers and broken tiles on the floor in the residence which had been reported to maintenance who they were in the process of repairing them. The officer confirmed the provision of handrails on the residence stairways, and mentioned that all the electric wires were expected to be protected where it is necessary in the SHFs.

She further stated that there are no lifts for disabled students in all the SHFs, but accommodations were only provided for the disabled students in the ground floor sections for potential safety reasons and to aid easy accessibility. The respondent further emphasised the stress disabled students go through while accessing toilet facilities, which are located across the on-campus SHFs. The officer further pointed out that a safety support feature such as an emergency helpline that students with disabilities can use in the toilet in case of any emergency is lacking.

According to the safety officer, there is no air conditioning in the SHFs. She stated that in winter it is problematic because students put on their hot plates to warm up the rooms and students often leave them on and as a result many rooms get burnt in the hostel. In response



to that challenge, there is provision for fitted heaters in the SHF rooms, though some rooms still lack heaters at the moment she stated.

#### **4.4.6 Other/general safety measures put in place in on-campus SHFs**

There are first aid-boxes with a trained first-aider for each on-campus SHFs. In the absence of a first-aider, the house parent will fill that position because they are also trained as first-aiders. A well-equipped on-campus health clinic is provided for the students, though the clinic only attends to students during office hours. The on-campus clinic does not offer 24 hours' service. There is an accident log in the residence and house parents are responsible for whatever needs to be reported at the clinic in case of accident or injury.

The officer further mentioned that no recycling collection points was allotted for waste items around the SHFs. In addition, the officer said that some barriers were often encountered during building renovation activities on the campus and in the SHFs. With the intention of averting these barriers, official contractors were mandated to tender company's health and safety plan before the commencement of any renovation activity. The respondent stated that a year ago, the university was facing environmental cleaning service problems in the midst of the campaign for #FeesMustFall, which later improved.

In conclusion, SHE officer at the university acknowledged some safety gap in the management of the on-campus SHFs. She then suggested an improvement of the safety measures within the university SHFs and entire campus environment.

### **4.5 Responses to the research questionnaire**

Data was also collected through a questionnaire survey method. A total of 200 questionnaires were administered to students living in the on-campus SHFs that belongs to university A. 180 questionnaires were returned from the respondents. However, 11 of the questionnaires were discarded because they were not well/fully completed. Thus, a total of 169 questionnaires were properly completed and analysed. The questionnaires were purposely delivered to students who have lived at least one (1) year in the residence. This was done to ensure that respondents had a better understanding of safety issues at their various residences. Below is the presentation of the analysis from university A.

#### **4.5.1 Profile of respondents in university A**

Table 4.1 below indicates that 40.8% (69) of the respondents are male while 59.2% (100) are female. 88.8% (150) are undergraduate students, 11.2% (19) are postgraduate students. 52.7% (89) of the respondents have been living in the residence for 3 years or more, 45.0% (76) for 2 years, 2.4% (4) for a period of 1 year. The highest number of respondents have lived

in the hostel for more than 3 years, which is a good indication that the majority of the respondents have a good experience about the SHFs. 4.7% (8) of the respondents are coloured, 93.5% (158) are black, and 1.8% (3) are white. A possible reason for these numbers could be relocation factor, because many black students come from other provinces (Eastern and Northern Cape Province) of the country. In essence, this effect could necessitate their living in the on-campus residence. The age of the respondents who partook in the study ranged from less than 20 years (1.8%), 20 – 25 years (66.9%), 26 – 30 years (21.9%), 31 – 35 years (8.3%) and more than 36 years (1.2%). It is evident that over 98% of the respondents were above 20 years.

Table 4.1: Profile of respondent at university A

Gender	Respondents	Percentage (%)
Male	69	40.8
Female	100	59.2
<b>Total</b>	<b>169</b>	<b>100</b>
<b>Level of study</b>		
Undergraduate	150	88.8
Postgraduate	19	11.2
<b>Total</b>	<b>169</b>	<b>100</b>
<b>Years of living in the hostel</b>		
3 years & above	89	52.7
2 years	76	45.0
1 year	4	2.4
<b>Total</b>	<b>169</b>	<b>100.1</b>
<b>Race</b>		
Coloured	8	4.7
Black	158	93.5
White	3	1.8
<b>Total</b>	<b>169</b>	<b>100</b>
<b>Age group</b>		
Under 20 years	3	1.8
20 – 25 years	113	66.9
26 – 30 years	37	21.9
31 – 35 years	14	8.3
Over 36 years	2	1.2
<b>Total</b>	<b>169</b>	<b>100.1</b>

#### 4.5.2 Testing for the reliability of questions used (university A)

The purpose of using Cronbach's alpha coefficient in this study was to check the reliability of the scale questions. The Cronbach's alpha coefficient of the scale questions for this study was 0.85% average. Nieuwenhuis (2007: 71) indicated that 0.80 could be used as a rule of thumb

to represent a sustainable level of internal reliability. However, Cronbach's alpha of 0.85 indicates a high level of internal consistency (Laerd Statistics, 2018). This implies that the scale questions and variables used were strongly reliable. The full Cronbach's alpha coefficient table is presented in Table 4.2 below.

Table 4.2: Summary of the reliability test at university A

Question No.	Statement	Number of items	Cronbach's alpha coefficient
Section B1	Level of provision of security measures in the SHFs	13	0.67
Section B2	Level of provision of fire safety measures in the SHFs	13	0.78
Section B3	Level of provision of traffic safety measures in an on-campus SHFs	11	0.76
Section B4	Level of provision of building safety measures in the SHFs	14	0.74
Section B5	Level of provision of other/general safety measures in the SHFs	11	0.78
Section C1	Level of importance of security measures in the SHFs	13	0.85
Section C2	Level of importance of fire safety measures in the SHFs	13	0.91
Section C3	Level of importance of traffic safety measures in an on-campus SHFs	11	0.80
Section C4	Level of importance of building safety measures in the SHFs	14	0.82
Section C5	Level of importance of other/general safety measures in the SHFs	11	0.81
Section D1	Level of risk with lack of security measures in the SHFs	13	0.72
Section D2	Level of risk with lack of fire safety measures in the SHFs	13	0.89
Section D3	Level of risk with lack of traffic safety measures in an on-campus SHFs	11	0.87
Section D4	Level of risk with lack of building safety measures in the SHFs	14	0.86
Section D5	Level of risk with lack of other/general safety measures in the SHFs	11	0.84
Section E1	Level of satisfaction with security measures in the SHFs	13	0.80
Section E2	Level of satisfaction with fire safety measures in the SHFs	13	0.89
Section E3	Level of satisfaction with traffic safety measures in an on-campus SHFs	11	0.86
Section E4	Level of satisfaction with building safety measures in the SHFs	14	0.83
Section E5	Level of satisfaction with other/general safety measures in the SHFs	11	0.87

#### 4.5.3 Presentation and discussion (university A)

The interpretation of the mean score (MS) is based on the studies done by Adewunmi, Omirin, Famuyiwa, and Farinloye (2011: 160), Simpeh and Akinlolu (2018:4). Table 4.3 below shows the different MS categories and how each category or level is interpreted.

Table 4.3: Interpretation of mean score (MS)

MS value range	Interpretation			
	Provision	Importance	Risk	Satisfaction
> 4.20 ≤ 5.00	Well provided	Extremely important	Very high risk	Extremely satisfied
> 3.40 ≤ 4.20	Provided	Important	High risk	Satisfied
> 2.60 ≤ 3.40	Somewhat provided	Average important	Moderate risk	Average satisfied/Neutral
> 1.80 ≤ 2.60	Poorly provided	Not important	Low risk	Dissatisfied
> 1.00 ≤ 1.80	Not provided	Not at all important	No risk	Extremely dissatisfied

**4.5.4 Provision of different measures to ensure SHF safety at university A**

Table 4.4, presents the level of provision of security measures in the SHFs, ranked on a 5-point Likert scale where 1 = Not provided, 2 = Poorly provided, 3 = Somewhat provided, 4 = Provided and 5 = Well provided.

Note:

Where the two variables obtained equal value, they are both numbered the same. It is also important to note that the 'Unsure' and 'Not applicable' scores were excluded in the calculation of the mean scores.

Table 4.4: Level of provision of different measures to ensure SHF safety at university A

Factors measured	Response (%)					Mean Score	Rank	
	Unsure	Not provided.....Well provided						
		1	2	3	4			5
<b>Security measures</b>								
Lighting at night in/around the hostel	0	1.8	13.6	8.9	32.0	43.8	4.02	1
Security guard on post	0	1.2	17.2	20.1	42.0	19.5	3.61	2
Fencing around the hostel	1.2	29.0	7.1	11.8	30.2	20.7	3.07	3
Security checkpoints at the entrance of the hostel	2.4	11.2	30.2	16.6	26.6	13.0	3.00	4
Security signs for warning	5.9	32.5	18.3	16.6	11.8	14.8	2.55	5
Written policy prohibiting vandalism	13.6	34.3	11.2	15.4	17.2	8.3	2.47	6
Notice board displaying security policies	8.9	45.6	17.2	13.6	8.3	6.5	2.04	7
Security patrol around the hostel	3.6	46.2	31.4	11.2	6.5	1.2	1.80	8
Access control with functional smart card	2.4	60.4	17.2	10.7	7.7	1.8	1.70	9
Security alarm to sensitise in case of emergency	11.8	62.7	10.7	5.9	6.5	2.4	1.58	10
Electronic coded locks on the doors at the hostel	0.6	74.6	10.7	4.7	3.6	5.9	1.54	11
Weapon detector at security checkpoint	4.7	80.5	7.1	5.9	1.8	0	1.25	12
CCTV for monitoring	4.1	77.5	15.4	1.8	0	1.2	1.24	13
<b>Average mean score</b>							<b>2.29</b>	

Continuation of Table 4.4.

Factors measured	Response (%)					Mean Score	Rank	
	Unsure	Not provided.....		Well provided				
		1	2	3	4			5
<b>Fire safety measures</b>								
Fire extinguishers	2.4	6.5	13.0	16.0	45.6	16.6	3.53	1
Fire hose reels	10.7	14.2	11.2	8.3	40.8	14.8	3.34	2
Fire hydrants	12.4	8.3	11.8	16.6	43.8	7.1	3.33	3
Electrical outlets and switches	7.1	15.4	9.5	11.2	44.4	12.4	3.31	4
Fire assembly point	7.1	18.9	11.8	53.3	8.3	0.6	2.56	5
Fire safety signs	10.1	33.1	19.5	13.0	6.5	17.8	2.51	6
Emergency exit (fire escape doors)	4.1	22.5	31.4	21.3	14.2	6.5	2.48	7
Emergency help lines	5.9	40.8	32.0	13.6	7.7	0	1.87	8
Fire alarm to sensitise in case of fire emergency	17.2	47.3	17.2	12.4	4.1	1.8	1.74	9
Emergency protocol posters on the wall	4.7	60.9	16.6	10.1	5.3	2.4	1.65	10
Water sprinkler system	11.8	56.2	15.4	7.7	8.9	0	1.65	10
Evacuation fire drills	16.6	55.0	12.4	11.2	4.7	16.6	1.58	11
Smoke detectors	10.1	33.1	19.5	13.0	6.5	17.8	1.41	12
Average mean score							2.38	
<b>Traffic safety measures</b>								
Parking space for students and visitors	0.6	1.8	0.6	8.9	47.9	40.2	4.25	1
Unobstructed parking area	4.1	4.1	1.2	15.4	39.6	35.5	4.06	2
Hostel road safe for vehicle use	3.0	4.1	3.0	12.4	41.4	36.1	4.05	3
Speed bumps	3.0	5.9	7.7	11.8	33.7	37.9	3.92	4
Traffic signs	3.0	18.3	4.7	23.7	26.6	23.7	3.33	5
Parking for disabled	14.8	20.1	3.0	11.8	29.0	21.3	3.33	5
Pedestrian crossing	3.0	20.7	7.7	17.2	26.6	24.9	3.28	6
Tags for vehicles	13.6	39.1	20.1	7.1	13.0	7.1	2.17	7
Vehicle access control	13.6	34.3	28.4	11.8	9.5	2.4	2.04	8
Guard for vehicle monitoring	9.5	60.4	13.6	10.7	5.3	0.6	1.59	9
Traffic lights	4.7	86.4	4.1	0.6	3.6	0.6	1.19	10
Average mean score							3.02	
<b>Building safety measures</b>								
Handrails on the stairs	0.6	4.7	11.2	16.0	32.5	34.9	3.82	1
Burglar bars on the windows	0	11.8	5.3	7.7	40.2	34.9	3.81	2
Covered indoor water mains/manholes	24.9	8.9	7.1	11.2	36.1	11.8	3.46	3
Covered outdoor water mains/manholes	21.9	11.2	10.1	10.1	39.6	7.1	3.27	4
Walls painted	0.6	4.7	24.9	24.9	32.5	12.4	3.23	5
Stairs ways illuminated	6.5	13.6	15.4	17.8	32.5	14.2	3.19	6
Tiles on the floor (not lifting & no cracks)	0.6	7.7	24.9	30.2	24.4	12.4	3.08	7
Electric wires protected	3.6	16.6	20.7	18.9	24.9	15.4	3.01	8
Walls plastered (no cracks)	1.2	10.7	16.6	40.2	25.4	5.9	2.99	9
Showers (without leakage)	0.6	11.8	44.4	27.2	9.5	6.5	2.54	10
Indoor ventilation	4.1	39.6	20.1	27.2	6.5	2.4	2.08	11
Toilet facility for disabled students	2.4	82.2	7.7	4.7	1.2	1.8	1.28	12
Burglar bars on the doors	0.6	82.8	11.8	4.1	0.6	0	1.22	13
Lift for disabled students	1.2	89.3	4.1	4.7	0.6	0.6	1.16	14
Average mean score							2.72	

Continuation of Table 4.4.

Factor measured	Response (%)					Mean Score	Rank	
	Unsure	Not provided.....		Well provided				
		1	2	3	4			5
<b>Other / General safety measures</b>								
On-campus health clinic	1.2	0.6	2.4	7.7	37.3	50.9	4.37	1
Lawn maintenance	1.2	1.8	4.7	17.8	41.4	33.1	4.00	2
Waste bin facilities	2.4	3.0	9.5	10.7	50.3	24.3	3.85	3
Waste disposal area	1.8	4.1	18.9	14.8	39.1	21.3	3.55	4
Cleaning around the hostel	0.6	3.6	20.7	18.3	43.2	13.6	3.42	5
Hostel environment free from stagnant water	10.1	8.9	13.6	13.6	39.1	14.8	3.41	6
Barricades for ongoing construction	19.5	8.9	10.1	17.8	29.0	14.8	3.38	7
Protected excavations around the hostel	22.5	14.8	8.3	20.1	26.0	8.3	3.06	8
Accident log	18.9	40.2	24.3	8.9	7.7	0	1.80	9
First-aid box	13.6	38.5	33.7	10.1	3.6	0.6	1.77	10
Emergency medically trained personnel on post	12.4	54.4	23.1	7.7	1.8	0.6	1.42	11
Average mean score							3.09	

#### 4.5.4.1 Security measures

The MS of responses in Table 4.4 indicates that lighting at night in/around the SHFs was ranked first as the most provided security measure with a MS of 4.02, security guard on post was ranked second with a MS of 3.61, fencing around the hostel was ranked third with a MS of 3.07, security checkpoint at the entrance of the hostel was ranked fourth with a MS of 3.00. Closed-circuit television (CCTV) for monitoring was ranked as the most lacking/not provided security measure in the SHFs with a MS as low as 1.24.

The findings further indicate that none of the measures was ranked as 'well provided'. Lighting at night in/around the SHFs with a MS of 4.02 and security guards on post with a MS of 3.61 were the security measure that was perceived as 'provided'. Fencing around the SHFs with a MS of 3.07 and security checkpoints at the entrance of the SHFs with a MS of 3.00 were security measures that fell within 'somewhat provided'. Security patrol around the SHFs with a MS of 1.80 fell within 'poorly provided'. The MS of 1.24 obtained for CCTV for monitoring shows that participants perceived it as 'not provided'. Other security measures ranked as 'not provided' were access control with functional smart card with a MS of 1.70, security alarm to sensitise in case of emergency with a MS of 1.58, electronic coded locks on the doors at the hostel with a MS of 1.54, and weapon detectors at security checkpoints with a MS of 1.25.

It can be deduced from the findings that quite a number of the security measures are 'poorly provided' or 'not provided' in the SHFs. This could be a high risk to the students residing in

the on-campus SHFs. Observation and interviews conducted by the researcher established the lack of and/or poor provision of such security measures. For example, it was observed that there was no CCTV in the majority of the SHFs. Also, CCTV had the lowest MS of 1.24 which signified non-provision in the SHFs. However, the interview with the SHE officer revealed that though CCTV was not provided in all the SHFs, provision was made for CCTV in some residences. The interview also revealed that control room which was vandalised by students during the #FeesMustFall protest rendered most of security and fire safety measures on campus non-functional. Tanner-Smith and Fisher (2016: 209) commented that, the provision of visible security measures on campus such as CCTV would prevent crime and violence by minimising the presence of motivated offenders in and around university environment.

It was observed that lighting was not well provided at night as surrounding and rear side of some SHFs were dark during the observation. In addition, the interview conducted with the SHE officer confirmed that university aimed to improve on the provision of lighting at night. It is therefore quite surprising that the majority of respondents indicated that lighting at night was well provided. Another point of concern was security guards maintaining 24 hours on post at the entrance of SHFs which was ranked second. During the observation conducted by the researcher, it was discovered that security guards do not always maintain 24 hours on post, possibly because the security guard coordinator fails to do his or her hourly checks. The average MS of 2.29 obtained for the level of provision for security measures in the SHF is an indication of 'poorly provided'. Therefore, there is a need for the university to concentrate on improving the security measures in the SHFs.

#### **4.5.4.2 Fire safety measures**

Table 4.4 above also portrays the MS obtained for the level of provision of fire safety measures in the SHFs. The fire safety measure that was ranked as provided was fire extinguishers with a MS of 3.53. Fire hose reel was ranked second with a MS of 3.34, ranked third were fire hydrants with a MS of 3.33 and electrical outlets and switches with a MS of 3.31 was ranked fourth. The MS implies that the aforementioned fire safety measures were 'somewhat provided' in the SHFs. The fire safety measures that were found to be 'poorly provided' include fire assembly point with a MS of 2.56, fire safety signs with a MS of 2.51, emergency exit (fire escape doors) with a MS of 2.48 and emergency help lines with a MS of 1.87. Respondents ranked fire alarm, emergency protocol posters on the wall, water sprinkler system, and evacuation fire drills as fire safety measures which are 'not provided' in the SHFs – the MS obtained ranged from 1.74 and 1.58. Smoke detectors had the lowest MS of 1.41. None of the fire safety measures were ranked as 'well provided'.

It was discovered during the observation that although there was no fire assembly point within some of the SHFs, there were nearby fire assembly points within the campus field and some conspicuous locations in the university environment. The interview conducted confirmed non-functionality of some fire safety measures in the SHFs during the time this research was conducted owing to vandalism of the university central control room. According to Agyekum *et al.* (2016: 54), persistent increases in fire related issues in hostel accommodation has been traced to lack or poor performance of fire safety measures in the university dormitories. Agyekum *et al.* (2016:56) further explained that inadequacies of firefighting equipment, poor housekeeping, and lack of proper maintenance were some of the critical challenges to effective fire safety management in the residence. The average mean score obtained is an indication that the university must improve on fire safety measures in the SHFs.

#### **4.5.4.3 Traffic safety measures**

Table 4.4 above further reveals the level of provision of traffic safety measures around the on-campus SHFs. The MS obtained for the majority of the traffic safety measures is an indication that respondents were more satisfied with the level of provision of traffic safety measures. Ranking by the MS of responses, parking space for students and visitors with a MS of 4.25, unobstructed parking area with a MS of 4.06, hostel road safe for vehicle use with a MS of 4.05, and speed bumps with a MS of 3.92, were traffic safety measures that ranged from 'well provided' to 'provided'. Furthermore, respondents ranked traffic signs with a MS of 3.33, parking for disabled with a MS of 3.33 and pedestrian crossing signs with a MS of 3.28 as traffic safety measures that were 'somewhat provided'. However, the few notable traffic safety measures which respondents perceived as 'poorly provided' were tags for vehicles with a MS of 2.17 and vehicle access control with a MS of 2.04. Notably, the majority of the respondents ranked guards to monitor vehicles with a MS of 1.59 and traffic lights with a MS as low as 1.19 as traffic safety measures that were not provided on campus. The observation and interview support the MS obtained from the survey.

Other studies by Schwebel *et al.* (2012: 268) and Rodriguez *et al.* (2013: 47) pointed out lack of traffic safety measures such as guards to monitor vehicles, vehicle access control and traffic lights in some mega-institutions in South Africa. The findings of this study also indicate that these traffic safety measures are not well provided.

#### **4.5.4.4 Building safety measures**

In terms of the level of provision of building safety measures in the SHFs as presented in Table 4.4 above, none of the building safety measures was ranked as 'well provided'. Handrails on



the stairs was ranked first with a MS of 3.82, ranked second were burglar bars on the windows with a MS of 3.81, and ranked third were covered indoor water mains/manholes with a MS of 3.46. All these building safety measures were ranked as 'provided'. The building safety measures that fell within 'somewhat provided' include covered outdoor water mains/manholes with a MS of 3.27, wall well painted with a MS of 3.23, illuminated stairways with a MS of 3.19, tiles on the floor (not lifting and no cracks) with a MS of 3.08, electric wire protected with a MS of 3.01, and, as well as, walls plastered (no cracks) with a MS of 2.99. The building safety measures that respondents ranked as poorly provided were showers (without leakage) with a MS of 2.54 and indoor ventilation with a MS of 2.08 respectively. The findings further indicate that disabled toilet facilities with a MS of 1.28, burglar bars on the doors with a MS of 1.22 and lifts for disabled students with MS as low as 1.16 were all ranked as 'not provided'.

Observation also state that there is evidence of cracks on the interior walls, leaks in the showers and peeling of plaster and paints in the SHFs. The interview conducted with the safety officer also confirmed the evidence of such across the residences though she also added that the issue had been reported to university maintenance department. In terms of disabled toilet facilities, though the majority of the respondents responded 'not provided', the interview indicated that provision was made for disabled toilet facilities on the ground floors in the residences. The interview also supported the fact that provision was not made for a lift for disabled students because they were normally placed on the ground floor in the SHFs. The safety officer mentioned that what was missing in the disabled toilets was an emergency telephone that disabled students can just press in case of fall or when stranded in the toilet before it gets out of hand. From the responses, observation and interview conducted, it is apparent that improvement is needed in building safety measures in the SHFs as well.

#### **4.5.4.5 Other/general safety measures**

Ranking by the MS as indicated in Table 4.4 above, an on-campus health clinic was ranked first as the most provided general safety measure on campus with a MS of 4.37, ranked second was lawn maintenance with a MS of 4.00, waste bin facility was ranked third with a MS of 3.85, waste disposal area was ranked fourth with a MS of 3.55, ranked fifth was cleaning around the hostel with a MS of 3.42, hostel environment free of stagnant water was ranked sixth with a MS of 3.41, followed by barricades for ongoing construction with a MS of 3.38 and protected excavations around the hostel with a MS of 3.06. However, the MS obtained for the remaining general safety measures demonstrate a ranking of 'not provided' by the respondents: trained first-aid personnel on post with a MS of 1.42, first-aid box with a MS of 1.77, and accident log with a MS of 1.80.

The possible reason for this was established during the interview. The safety officer confirmed that there might not be evidence of emergency medically trained personnel on post in the SHFs; however, house parents were trained as first aiders to render immediate medical service to student before the transfer of a casualty to hospital. However, the level of training and capability of house parents to render such services was not established. The overall MS obtained for other/general safety measures for the on-campus SHFs indicate that respondents were more pleased with provision of such measures as shown in Table 4.4 above. Amsterdam (2013: 3) and Memon, Solangi and Abro (2018: 96) observed that poor cleaning services, absence of a 24 hour campus clinic and lack of general safety measures can jeopardise student health and safety on campus. The need to attend to the issue of trained first-aiders on duty is therefore paramount.

#### 4.5.5 Importance of different safety measures put in place in the SHFs at university A

Table 4.5 records the level of importance students attached to different measures put in place to guarantee safety in SHFs, ranked on a 5-point Likert scale where 1 = Not at all important, 2 = Not important, 3 = Averagely important / Neutral, 4 = Important and 5 = Extremely important.

Table 4.5: Importance of different safety measures put in place in the SHFs at university A

Factors measured	Response (%)						Mean Score	Rank
	Unsur	Not at all important.....Extremely important						
		1	2	3	4	5		
<b>Security measures</b>								
Lighting at night in/around the hostel	0	0	0.6	4.7	20.7	74.0	4.68	1
Security guard on post	0	0	0	4.1	23.1	72.8	4.68	1
Security alarm to sensitise in case of emergency	0	0.6	1.3	5.3	16.6	76.3	4.66	2
CCTV for monitoring	0	0	0.6	8.9	19.5	71.0	4.60	3
Weapon detector	0	1.2	0	9.5	19.5	69.8	4.56	4
Security signs for warning	0.6	1.2	1.2	10.7	29.0	57.4	4.41	5
Security checkpoints at the entrance of the hostel	0	0.6	0	11.8	33.7	53.8	4.40	6
Access control with functional smart card	1.2	0.6	1.8	13.0	26.6	56.8	4.39	7
Security patrol around the hostel	0	1.8	3.0	10.1	24.9	60.4	4.39	7
Written policy prohibiting vandalism	0.6	0.6	1.2	14.2	27.8	55.6	4.37	8
Notice board displaying security policies	0	0.6	1.8	17.2	26.0	54.4	4.31	9
Electronic coded locks on the doors at the hostel	0	3.6	2.4	9.5	29.0	55.6	4.30	10
Fencing around the hostel	0	2.4	3.0	16.0	26.0	52.7	4.23	11
<b>Average mean score</b>							<b>4.46</b>	

Continuation of Table 4.5.

Factors measured	Response (%)						Mean Score	Rank
	Unsure	Not at all important.....Extremely important						
		1	2	3	4	5		
<b>Fire Safety measures</b>								
Fire extinguishers	0	0	0	1.8	22.5	75.7	4.73	1
Fire alarm	0	0.6	1.2	1.2	18.9	78.1	4.72	2
Emergency exit (fire escape doors)	0	0.6	0.6	1.8	27.2	69.8	4.65	3
Smoke detectors	0	1.2	0	5.3	24.9	68.6	4.59	4
Fire hydrants	4.1	0	0	5.9	29.0	60.9	4.57	5
Electrical outlets and switches	2.4	0.6	0.6	4.7	28.4	63.3	4.56	6
Emergency help lines	0	0.6	0	6.5	27.8	65.1	4.56	6
Fire hose reels	1.8	0	0	6.5	33.1	58.6	4.53	7
Fire safety signs	0.6	0	0.6	8.3	28.4	62.1	4.52	8
Fire assembly point	0	1.2	0	4.1	34.3	60.4	4.52	8
Emergency protocol posters on the wall	0	0	1.2	7.7	30.8	60.4	4.50	9
Evacuation fire drills	0.6	0.6	1.8	5.9	30.2	60.9	4.50	9
Water sprinkler system	0	0	0.6	10.1	32.5	56.8	4.45	10
<b>Average mean score</b>							<b>4.57</b>	
<b>Traffic safety measures</b>								
Parking for disabled	0	0.6	0	5.9	32.5	60.9	4.53	1
Hostel road safe for vehicle use	0	0	0	7.1	38.5	54.4	4.47	2
Parking space for students and visitors	0	0	0	5.3	42.6	52.1	4.46	3
Speed bumps	0	0	1.8	11.2	30.8	56.2	4.41	4
Vehicle access control	2.4	0	1.2	10.7	39.1	46.7	4.34	5
Unobstructed parking area	0.6	0.6	0	18.9	29.0	50.9	4.30	6
Pedestrian crossing	0	1.8	0	17.8	30.8	49.7	4.26	7
Guard for vehicle monitoring	4.7	1.2	0	12.4	42.0	39.6	4.26	7
Traffic signs	0	0.6	3.0	17.8	36.1	42.6	4.17	8
Tags for vehicles	4.1	1.2	1.2	12.4	46.7	34.3	4.16	9
Traffic lights	1.2	4.1	3.0	8.3	55.6	27.8	4.01	10
<b>Average mean score</b>							<b>4.31</b>	

Continuation of Table 4.5.

Factors measured	Response (%)						Mean Score	Rank
	Unsure	Not at all important.....Extremely important						
		1	2	3	4	5		
<b>Building safety measures</b>								
Showers (without leakage)	0	0	0	1.2	27.2	71.6	4.70	1
Lift for disabled students	0	0	0	4.1	21.9	74.0	4.69	2
Disabled toilet facility	0.6	0	0	4.1	23.1	72.2	4.68	3
Burglar bars on the windows	0	0	0	2.4	28.4	69.2	4.66	4
Electric wires protected	0.6	0.6	0.6	4.7	23.1	70.4	4.63	5
Indoor ventilation	1.2	0	0.6	6.5	25.4	66.3	4.59	6
Handrails on the stairs	0	0	0	4.1	33.7	62.1	4.57	7
Stairs ways illuminated	4.1	0	0	8.9	26.0	60.9	4.54	8
Tiles on the floor (not lifting & no cracks)	0	0	0.6	3.6	39.1	56.8	4.52	9
Walls plastered (no cracks)	0	0	0.6	6.5	36.1	56.8	4.49	10
Covered indoor water mains/manholes	5.3	0	0	13.0	29.0	52.7	4.42	11
Covered outdoor water mains/manholes	5.3	0.6	0.6	9.5	32.0	52.1	4.41	12
Walls painted	0	0	0.6	8.3	40.2	50.9	4.41	12
Burglar bars on the doors	0	8.3	7.1	13.0	21.9	49.7	3.97	13
<b>Average mean score</b>							<b>4.52</b>	
<b>Other / General safety measures</b>								
On-campus health clinic	0	0	0	1.2	14.2	84.6	4.83	1
Cleaning around the hostel	0	0	0	0.6	20.7	78.7	4.78	2
Waste disposal area	0	0	0	0	30.2	69.8	4.69	3
Hostel environment free from stagnant water	1.8	0	0	4.7	22.5	70.4	4.67	4
First-aid box	0	0	0.6	4.7	24.9	69.8	4.63	5
Emergency medically trained personnel on post	0	0	0.6	5.9	22.5	71.0	4.63	5
Waste bin facilities	0	0	0.6	1.8	31.4	66.3	4.63	5
Protected excavations around the hostel	3.0	0	0.6	2.4	31.4	62.7	4.60	6
Barricades for ongoing construction	1.8	0	0	4.7	29.0	64.5	4.60	6
Accident log	1.8	0	0.6	8.3	34.9	54.4	4.45	7
Lawn maintenance	0	0	0	14.2	33.1	52.7	4.38	8
<b>Average mean score</b>							<b>4.63</b>	

#### **4.5.5.1 Security measures**

It is evident from the MS obtained that respondents perceived all the security measures highlighted in the table as 'extremely important' requirements in the SHFs. The MS obtained for all the security measures were above 4.20. More than 78% of the respondents responded in the range of 'important' to 'extremely important' for all the security measures. Lighting at night in/around the hostel with a MS of 4.68 was perceived to be the most important security measure required in the SHF, followed by security guards on post, security alarm to sensitise in case of emergency, closed-circuit television (CCTV) for monitoring, weapon detectors at security checkpoint, security signs for warning followed by security checkpoints at the entrance of the SHFs, access control with functional smart card, security patrols around the hostel, written policy prohibiting vandalism, notice board displaying security policies, and electronic coded locks on the doors at the hostel. Fencing around the hostel was the lowest ranked measure with a MS of 4.23 (see Table 4.5 above).

The study conducted on the relative importance of student accommodation quality in higher education by Nimako and Bondinuba (2013: 134) discovered that security measures in the SHFs were among the first three most important measures ranked by the respondents. Clearly, the overall MS obtained for security measures in table indicates that the majority of the respondents felt that security measures in the SHFs is either 'important' or 'extremely important' and provision of such measures would improve the safety of SHFs.

#### **4.5.5.2 Fire safety measures**

Table 4.5 above further indicates the level of importance of fire safety measures in the SHFs. The MS obtained demonstrate a perception of 'important' and 'extremely important'. More than 88% responded in the range of 'important and 'extremely important'. The MS suggests that all the measures were ranked as 'extremely important' in the SHFs. Fire extinguishers were the highest rank with a MS of 4.73 whilst a water sprinkler system was the lowest ranked with a MS of 4.45. According to Agyekum, Ayarkwa and Amoah (2016: 53), provision of fire safety measures plays an important role in ensuring the safety of student housing against fire outbreak. Chen *et al.* (2012: 312) stressed that student housing is susceptible to fire due to the amount of inflammable materials and student lifestyles. As such, it is important that hostel providers make provision for necessary fire safety measures in hostels.

#### **4.5.5.3 Traffic safety measures**

The MS provided in Table 4.5 above indicates that traffic safety measures are important factor that contributes to safety of the on-campus SHFs. The MS obtained ranged from 4.53 for parking for disabled people (highest) to 4.01 for traffic lights (lowest). The mean score signified that all traffic safety measures highlighted in the table ranged from 'extremely important' to 'important'. With the exception of traffic signs with a MS of 4.17, tags for vehicles with a MS of 4.16 and traffic lights with a MS 4.01, all the other traffic safety measures were ranked as 'extremely important' measures.

According to Schwebel *et al.* (2012: 268), to prevent accidents on campus, it is important to make provision for traffic safety measures on campuses and nearby highways. This clearly support the findings of this study.

#### **4.5.5.4 Building safety measures**

The findings from this study also indicated that with the exception of burglar bars on the doors with a MS of 3.97, respondents perceived all building safety measures in Table 4.5 above as 'extremely important' measures that will improve the safety in the SHFs if provided. Apart from burglar bars on the doors where a notable percentage of responses fell within important and averagely important with a MS of 3.97, all the remaining building safety measures identified in the table obtained a MS between 4.70 and 4.41. Rodriguez *et al.* (2013: 47) also highlighted the importance of such measures in the entire university housing infrastructure.

#### **4.5.5.5 Other/general safety measures**

More than 85% of the responses fell in the range of 'important' and 'extremely important'. It was found that hostel environments free from stagnant water, on-campus health clinic, cleaning around the hostel, waste disposal area, protected excavations around the hostel, waste bin facilities, first-aid box, barricades for ongoing construction, emergency medically trained personnel on post, an accident log and lawn maintenance are all extremely important measures that can ensure a safe SHF.

Garcia, Lechner and Frerich (2014: 387) pointed to the importance of 24 hour on-campus health services as many emerging adult student report unmet safety and health issues at their various university residences. Hassanain (2008a: 212) elaborated that in order for students to perform well academically, it is important that institution management ensure adequate provision of health facilities and other general safety measures in the on-campus SHFs.

#### 4.5.6 Risk associated with absence / lack of different measures required to ensure safety in the SHF at university A

In this section respondents were asked to rank the level of risk associated with absence of different measures required to ensure safety in the SHFs ranked on a 5-point Likert scale where 1 = No risk, 2 = Low risk, 3 = Moderate risk, 4 = High risk and 5 = Very high risk.

Table 4.6: Risk associated with absence / lack of different measures required to ensure safety in the SHF at university A

Factor measured	Response (%)					Mean Score	Rank	
	Unsure	No risk.....Very high risk						
		1	2	3	4			5
<b>Security measures</b>								
Absence of security guard on post	0.6	0.6	0.6	6.5	27.8	63.9	4.55	1
Poor Lighting at night	0	0.6	1.2	7.1	27.8	63.3	4.52	2
Absence of weapon detector	0	0	0.6	10.1	29.6	59.8	4.48	3
Absence/lack of security alarm	0	0.6	0.6	10.7	37.3	50.9	4.37	4
Poor access control	1.2	0.6	2.4	8.3	39.6	47.9	4.33	5
Lack of closed-circuit television (CCTV)	1.2	0.6	1.2	12.4	35.5	49.1	4.32	6
Lack of security patrol around the hostel	0	1.2	1.2	12.4	35.5	49.7	4.31	7
Loose/porous security checkpoints	0.6	0.6	1.8	11.2	39.6	46.2	4.29	8
Absence of electronic coded locks on the doors	0	1.2	5.9	13.6	35.5	43.8	4.14	9
Lack of fencing around the hostel	0	1.2	4.7	21.9	23.1	49.1	4.14	9
Lack of security signs	0.6	0.6	1.2	24.3	38.5	34.9	4.07	10
Lack of written policy prohibiting vandalism	0.6	1.2	4.7	23.7	37.3	32.5	3.96	11
Lack of notice board displaying security policies	0	1.8	6.5	29.6	27.8	34.3	3.86	12
Average mean score							4.26	
<b>Fire safety measures</b>								
Lack of emergency exit	0	0	0.6	3.6	26.6	69.2	4.64	1
Absence of fire extinguishers	0	0.6	0	5.3	27.2	66.9	4.59	2
Lack of emergency help lines	0	0	0	5.9	33.7	60.4	4.54	3
Absence of fire alarms	0	0.6	1.8	5.3	31.4	60.9	4.50	4
Faulty electrical outlets and switches	1.8	0	0	8.9	33.1	56.2	4.48	5
Lack of fire hose reels	3.6	0	0	10.1	30.2	56.2	4.47	6
Absence of smoke detectors	0	0	1.2	11.8	30.8	56.2	4.42	7
Lack of fire hydrants	5.9	0	1.2	10.1	32.5	50.3	4.40	8
Lack of emergency protocol posters on the wall	0.6	0	0	15.4	33.7	50.3	4.35	9
Lack of water sprinklers	0.6	0	1.2	16.6	29.0	52.7	4.33	10
Lack of evacuation fire drills	3.6	0	1.2	13.6	34.9	46.7	4.31	11
Lack of fire assembly point	0.6	0	1.2	14.2	37.9	46.2	4.29	12
Absence of fire safety signs	0	0	2.4	21.9	33.1	42.6	4.15	13
Average mean score							4.42	

Continuation of Table 4.6.

Factor measured	Response (%)					Mean Score	Risk	
	Unsure	No risk.....Very high risk						
		1	2	3	4			5
<b>Traffic safety measures</b>								
Lack of parking for disabled	1.2	0	3.0	19.5	34.9	41.4	4.16	1
Absence of speed bumps	0	1.2	3.0	18.9	33.1	43.8	4.15	2
Obstructed parking space	0.6	0	1.8	24.9	40.2	32.5	4.05	3
Absence of traffic signs	0	1.2	5.3	20.1	38.5	34.9	4.00	4
Poor vehicle access control	1.8	2.4	2.4	23.7	39.1	30.8	3.95	5
Absence of pedestrian crossing	0	1.2	2.4	29.6	37.3	29.6	3.91	6
Poor road to hostel	0	0	4.7	30.8	36.7	27.8	3.87	7
Lack of guard for vehicle monitoring	0.6	1.2	4.1	32.0	32.0	30.2	3.86	8
Lack of tags for vehicles	1.8	1.8	4.1	33.7	28.4	30.2	3.82	9
Absence of parking space	0	1.2	8.9	34.9	31.4	23.7	3.67	10
Lack of traffic lights	1.2	7.1	17.2	29.0	21.3	24.3	3.40	11
Average mean score							3.90	
<b>Building safety measures</b>								
Exposed electric wires	0.6	0	0.6	3.0	20.1	75.7	4.72	1
Absence of burglar bars on windows	0	0	0.6	4.7	29.6	65.1	4.58	2
Lack of lift for disabled student	0.6	0.6	0.6	4.7	27.8	65.7	4.58	2
Lack of disabled toilet facility	0.6	0	1.2	10.1	30.2	58.0	4.45	3
Absence of handrails on the stairs	0.6	0	1.4	14.2	26.6	57.4	4.41	4
Uncovered indoor water mains/manholes	5.9	0	1.8	11.2	29.6	51.5	4.38	5
Uncovered outdoor water mains/manholes	5.9	0	1.2	13.0	29.6	50.3	4.37	6
Stairs ways not illuminated	7.1	0	1.8	17.8	23.1	50.3	4.31	7
Poor indoor ventilation	0.6	1.2	3.6	12.4	28.4	53.8	4.30	8
Evidence of crack on walls	0	0.6	2.4	13.6	33.1	50.3	4.30	8
Leaking showers in the hostel	0	0.6	1.8	14.8	34.9	47.9	4.27	9
Broken tiles on the floor	0	0.6	2.4	24.3	24.9	47.9	4.17	10
Absence of burglar bars on the doors	0	3.6	5.9	26.6	18.9	45.0	3.95	11
Peeling of plasters & paint on the walls	0	3.0	2.4	30.8	26.0	37.9	3.93	12
Average mean score							4.34	
<b>Other / General safety measures</b>								
Lack of on-campus health clinic	0.6	0.6	0	7.1	33.1	58.6	4.76	1
Poor cleaning around the hostel	0	0	0	8.3	25.4	66.3	4.57	2
Lack of waste disposal area	0	0	0.6	7.1	27.2	65.1	4.56	3
Lack of first-aid box	0	0	0.6	9.5	26.6	63.3	4.52	4
Unprotected excavations around hostel	0.6	0	1.2	9.5	27.2	61.5	4.50	5
Lack of emergency medically trained personnel on post	0	0	1.2	7.1	33.1	58.6	4.49	6
Stagnant water in/around the hostel	0.6	0	0	10.1	32.5	56.8	4.47	8
Lack of barricades for ongoing construction	1.8	0	0.6	12.4	26.6	58.6	4.45	7
Lack of waste bin facilities	0	0	3.6	14.8	31.4	50.3	4.28	9
Lack of accident log	1.2	0	2.4	18.3	33.1	45.0	4.22	10
Over grown grass around the hostel	0.6	2.4	1.8	21.3	27.2	46.7	4.15	11
Average mean score							4.45	



#### **4.5.6.1 Security measures**

The mean score obtained as shown in Table 4.6 indicates that respondents agreed that absence of all security measures would cause a high risk/very high risk in the SHFs. The MSs obtained ranged from 4.55 and 3.86. The majority of the respondents responded in the range of 'high risk' to 'very high risk' for all security measures except for lack of notice boards to display security policies in the hostel. The overall mean score obtained is an indication that absence of security measures in the SHFs would pose danger to the students.

Rodriguez *et al.* (2013: 42) highlighted that the absence of such security measures in the university infrastructure could result in theft, crime and violence acts. Observation and interview conducted confirmed the absence of some security measures in the SHFs.

#### **4.5.6.2 Fire safety measures**

With regards to fire safety measures in the SHF, the MSs obtained as depicted in Table 4.6 above were in the range of 4.64 (highest) and 4.15 (lowest). The mean scores obtained indicate that respondents acknowledged the risk associated with absence of fire safety measures at their residence. The majority of the responses fell within very high risk. All but the absence of fire safety signs with a MS of 4.15 were rated as 'extremely important'.

The study conducted by Hassanain (2008b: 59) also stated that lack of fire safety features in buildings is the major factor responsible for fire hazard. Similarly, Jackson *et al.* (2010: 43) postulated that apart from human behaviour and consumer products that can aggravate fire occurrence in building, lack of basic fire safety measures is considered the primary source. Additionally, the observation and interview conducted by the researcher revealed that certain fire safety measures such as a sprinkler system and smoke detectors are lacking in most of the SHFs. Also, some firefighting equipment was in poor working condition owing to the #FeesMustFall protest resulting in vandalism of the university control room. This calls for urgent attention from university management to improving fire safety measures in the SHFs.

#### **4.5.6.3 Traffic safety measures**

In Table 4.6 above, it is evident from the MS obtained that the majority of respondents perceived lack of traffic safety measures in the on-campus SHFs as a high risk. All the traffic safety measures were rated as 'high risk' if not provided. The MS obtained ranged from 4.16 and 3.40 which is an indication of 'high risk'. Schwebel *et al.* (2012: 267) commented that poor campus roads cause accident. The observation conducted shows that traffic safety measures were comparatively better provided.

#### **4.5.6.4 Building safety measures**

The MS obtained indicated that the majority of the respondents perceived that exposed electric wires, peeling of plasters and paint on the walls, lack of lifts for disabled students, absence of burglar bars on the windows, uncovered indoor water mains/manholes, uncovered outdoor water mains/manholes, lack of disabled toilet facilities, stairways not illuminated, absence of handrails on the stairs, poor indoor ventilation, cracks on walls, and leaking showers in the hostel would contribute a very high risk to residents. It is also evident that broken tiles on the floor with a MS of 4.17, absence of burglar bars on the doors with a MS of 3.95 and peeling of plasters and paint on the walls with a MS of 3.93 would contribute a high risk to residents. Sani-Anibire and Hassanain (2015: 354) and Olanrewaju *et al.* (2010: 120) also identified certain factors and conditions in SHFs with a high risk to building occupants which include poor ventilation, elevator failure, faulty electrical system and structural failure (see Table 4.6 above).

#### **4.5.6.5 Other/general safety measures**

As Table 4.6 above portrays, the MS suggest that the lack of all the general safety measures is a very high risk except for 'overgrown grass around the hostel which was ranked as 'high risk'. The MS obtained ranged from 4.76 and 4.15. Lack of an on-campus health clinic with a MS of 4.76 was ranked highest by the respondents, while overgrown grass around the hostel with a MS of 4.15 was ranked lowest. However, interview and observation show that although provision was made for an on-campus health clinic, the clinic did not offer 24hrs services for students. This calls for university attention though the officer stated during the interview that a plan is in place to partner with external medical service for after-hours emergency medical attention for on-campus residents.

#### **4.5.7 Satisfaction with the performance / functionality of different measures required to ensure SHF safety at university A**

This section presents the satisfaction level of students with different measures provided in the SHFs, ranked on a 5-point Likert scale: 1 = Extremely dissatisfied, 2 = Dissatisfied, 3 = Averagely satisfied, 4 = Satisfied, 5 = Extremely satisfied.

##### **4.5.7.1 Security measures**

The MS obtained as depicted in Table 4.7 below indicates that students were more satisfied with lighting at night in/around the hostel with a MS of 3.50 whilst 'CCTV' with a MS as low as 1.70 was ranked as the most dissatisfied security measure. Fencing around the hostel with a MS of 3.23 as well as security guard on post with a MS of 3.08 were ranked as 'averagely

satisfied'. Additionally, the respondents expressed a feeling of dissatisfaction with the following security measures in the SHFs; security checkpoints at the entrance of the hostel, security signs for warning, notice board displaying security policies, written policy prohibiting vandalism, access control with functional smart card, electronic coded locks on the doors at the hostel, security alarm to sensitise in case of emergency as well as security patrol around the SHFs, with MS ranging from 2.57 to 2.03. Clearly, students were extremely dissatisfied with measures such as CCTV for monitoring in the hostel and weapon detector at security checkpoint with MS as low as 1.70 and 1.71.

Interview and observation conducted by the researcher also established the absence and poor performance of such security measures in the SHFs. The findings of Hassanain (2008: 47) also state that users expressed a feeling of dissatisfaction when their expectation was not met in terms of provision, delivery and performance of building and other facilities. The result of study conducted on students' satisfaction with hostel accommodation by Oke *et al.*, (2017: 663) discovered that increased performance in hostel safety features in an on-campus SHFs usually influence the overall student satisfaction. According to Bella-Omunagbe (2015: 212), overall housing satisfaction is usually affected by the user's expectation in terms of provision and performance of different measures. Beyond a reasonable doubt, satisfaction is a function of meeting the expectations of facility users.

#### **4.5.7.2 Fire safety measures**

Table 4.7 also presents the level of students' satisfaction with fire safety measures in the SHFs. The findings revealed that students were averagely satisfied with performance or functionality of fire extinguishers in the SHFs with a MS of 2.82. Emergency exits (fire escape doors) with a MS of 2.36, fire safety signs with a MS of 2.32, fire assembly point with a MS of 2.29, evacuation fire drill with a MS of 2.24, lack of emergency helpline with a MS of 1.97 and water sprinkler system with a MS of 1.88 were fire safety measures that the majority of respondents expressed a feeling of dissatisfaction. The findings further revealed that students are extremely dissatisfied with lack of smoke detectors with a MS of 1.77.

Oke, *et al.*, (2017: 655) acknowledged that students are often dissatisfied with their hostel accommodation if facilities that are provided do not meet user's actual and aspirational need in the SHFs. Lack of emergency helpline and inadequate provision of smoke detectors in the SHFs were the two fire safety measures that had the lowest mean score. Observation and the interview conducted also established the lack of such measures. It was also discovered that students' lifestyle in the hostel also contributes to poor performance of firefighting equipment, especially when students got drunk, and vandalised and displaced fire equipment such as extinguishers, according to the safety officer.

Table 4.7: Satisfaction with the performance / functionality of different measures required to ensure SHF safety at university A

Factors measured	Response (%)						Mean Score	Rank
	Not applicable	Extremely dissatisfied.....Extremely satisfied						
		1	2	3	4	5		
<b>Security measures</b>								
Lighting at night in/around the hostel	0.6	7.7	11.8	27.2	28.4	24.3	3.50	1
Fencing around the hostel	3.0	6.5	20.1	28.4	27.8	14.2	3.23	2
Security guard on post	0	9.5	20.1	26.6	40.2	3.6	3.08	3
Security checkpoints at the entrance of the hostel	0	23.1	29.6	23.1	14.8	9.5	2.57	4
Security signs for warning	0	17.8	35.5	29.6	13.0	4.1	2.50	5
Notice board displaying security policies	1.2	17.8	47.9	27.2	4.7	1.2	2.22	6
Written policy prohibiting vandalism	1.2	21.3	45.6	26.0	5.3	0.6	2.21	7
Access control with functional smart card	1.2	30.8	39.1	22.5	5.3	1.2	2.05	8
Electronic coded locks on the doors at the hostel	1.8	37.3	34.3	16.0	7.7	3.0	2.03	9
Security patrol around the hostel	1.8	33.1	42.0	17.2	5.3	0.6	1.96	10
Security alarm to sensitise in case of emergency	4.7	35.5	42.6	12.4	4.1	0.6	1.86	11
Weapon detector at security checkpoint	1.2	50.9	29.6	14.8	3.0	0.6	1.71	12
CCTV for monitoring	3.6	48.5	32.0	12.4	3.0	0.6	1.70	13
<b>Average mean score</b>							<b>2.36</b>	
<b>Fire safety measures</b>								
Electrical outlets and switches	1.8	10.1	25.4	27.8	26.6	8.3	2.97	1
Fire hose reels	4.1	11.2	24.9	22.5	35.5	1.8	2.91	2
Fire hydrants	5.9	13.0	23.7	18.9	36.1	2.4	2.90	3
Fire extinguishers	0	12.4	21.3	42.6	18.3	5.3	2.82	4
Emergency exit (fire escape doors)	2.4	20.1	37.9	26.6	10.1	3.0	2.36	5
Fire safety signs	3.0	17.2	39.1	33.1	7.7	0	2.32	6
Fire assembly point	3.6	19.5	40.8	27.8	4.7	3.6	2.29	7
Evacuation fire drills	2.4	23.7	36.7	27.2	10.1	0	2.24	8
Fire alarm	4.1	31.4	35.5	26.0	3.0	0	2.00	9
Emergency protocol posters on the wall	0.6	24.9	52.1	20.1	2.4	0	2.00	9
Emergency help lines	0	26.6	53.3	16.6	3.0	0.6	1.97	10
Water sprinkler system	7.7	32.5	42.6	13.0	3.6	0.6	1.88	11
Smoke detectors	4.1	42.6	34.9	15.4	3.0	0	1.77	12
<b>Average mean score</b>							<b>2.34</b>	

Continuation of Table 4.7.

Factors measured	Response (%)						Mean Score	Rank
	Not applicable	Extremely dissatisfied.....Extremely satisfied						
		1	2	3	4	5		
<b>Traffic safety measures</b>								
Parking space for students and visitors	0.6	1.8	3.6	22.5	49.7	21.9	3.86	1
Speed bumps	1.2	1.2	7.1	19.5	47.9	23.1	3.85	2
Hostel road safe for vehicle use	0	1.2	3.6	23.7	52.1	19.5	3.85	2
Unobstructed parking area	0	1.2	7.1	23.1	50.9	17.8	3.76	3
Traffic signs	1.2	3.6	11.2	18.3	49.7	16.0	3.64	4
Pedestrian crossing	1.8	4.7	7.7	29.0	40.2	16.6	3.57	5
Parking for disabled	3.0	8.9	19.5	18.9	34.3	15.4	3.28	6
Guard for vehicle monitoring	5.9	14.2	35.5	18.3	17.2	8.9	2.69	7
Vehicle access control	5.3	8.9	43.8	23.7	11.2	7.1	2.61	8
Tags for vehicles	5.9	5.9	50.9	18.9	15.4	3.0	2.55	9
Traffic lights	13.	21.3	34.9	16.0	13.0	1.2	2.28	10
Average mean score							3.27	
<b>Building safety measures</b>								
Burglar bars on the windows	1.2	5.9	21.3	22.5	29.6	19.5	3.35	1
Covered indoor water mains/manholes	7.1	7.1	10.1	30.8	36.1	8.9	3.31	2
Covered outdoor water mains/manholes	6.5	7.1	13.6	25.4	40.8	6.5	3.27	3
Handrails on the stairs	0.6	5.9	16.6	40.8	30.2	5.9	3.13	4
Stairs ways illuminated	0.6	7.1	24.9	47.3	13.6	6.5	2.87	5
Tiles on the floor (not lifting & no cracks)	0.6	10.1	22.5	48.5	13.6	4.7	2.80	6
Electric wires protected	1.8	16.0	23.1	32.0	19.5	7.7	2.79	7
Walls painted	0	11.2	24.3	52.1	10.1	2.4	2.68	8
Walls plastered (no cracks)	0	8.9	46.2	30.2	10.7	4.1	2.55	9
Showers (without leakage)	0	18.3	34.9	38.5	6.5	1.8	2.38	10
Indoor ventilation	0	27.2	27.2	34.9	8.3	2.4	2.31	11
Burglar bars on the doors	5.9	19.5	47.9	24.3	1.8	0.6	2.10	12
Disabled toilet facility	5.3	49.7	29.6	11.8	3.6	0	1.67	13
Lift for disabled students	4.7	51.5	34.9	7.1	1.8	0	1.57	14
Average mean score							2.63	
<b>Other / General safety measures</b>								
On-campus health clinic	0	5.3	13.6	15.4	30.8	34.9	3.76	1
Lawn maintenance	0.6	7.1	7.1	23.7	35.5	26.0	3.66	2
Hostel environment free from stagnant water	5.9	8.3	12.4	24.3	32.0	17.2	3.39	3
Waste bin facilities	0.6	9.5	12.4	27.2	36.7	13.6	3.32	4
Waste disposal area	1.2	7.1	13.0	32.0	37.3	9.5	3.29	5
Protected excavations around the hostel	5.9	7.7	13.6	29.6	31.4	11.8	3.27	6

Continuation of Table 4.7.

Factors measured	Response (%)					Mean Score	Rank	
	Not applicable	Extremely dissatisfied.....Extremely satisfied						
		1	2	3	4			5
<b>Other / General safety measures</b>								
Barricades for ongoing construction	5.3	6.5	16.0	36.1	25.4	10.7	3.18	7
Cleaning around the hostel	8.3	10.7	17.2	33.1	30.8	8.3	3.08	8
Accident log	4.7	14.8	56.2	21.3	3.0	0	2.13	9
First-aid box	5.3	21.9	51.5	14.8	5.9	0.6	2.06	10
Emergency medically trained personnel on post	4.7	24.3	51.5	16.6	2.4	0.6	1.98	11
Average mean score							3.01	

#### 4.5.7.3 Traffic safety measures

Table 4.7 above further depicts student satisfaction with the performance of traffic safety measures in the on-campus SHFs. The MS obtained indicate that respondents were satisfied with the majority of the traffic safety measures in the on-campus SHFs. Respondents ranked parking space for students and visitors with a MS of 3.86, speed bumps with a MS of 3.85, hostel road safe for vehicle use with a MS of 3.85, unobstructed parking area with a MS of 3.76, traffic signs with a MS of 3.64, pedestrian crossing with a MS of 3.57 as traffic safety measures that met their expectation and were thereby satisfied. However, the findings showed that respondents felt average satisfaction with a few traffic safety measures such as; guard for vehicle monitoring with a MS of 2.69 and vehicle access control with a MS of 2.61. Respondents were only dissatisfied with traffic lights with a MS of 2.28 as well as tags for vehicles with a MS of 2.55. This signified that respondents were comparatively more satisfied with traffic safety measures.

The interview and observation conducted by the researcher also established the absence of traffic lights, lack of guard for vehicle monitoring and poor vehicle access control at the main entrance to the campus. Eckert (2012: 350) indicates that a safe campus road, where adequate provision is made for traffic safety features often limits the rate of accident on campus and influence student satisfaction.

#### 4.5.7.4 Building safety measures

Table 4.7 above shows student satisfaction levels with building safety measures in the SHFs. The building safety measures that fell within the range of average satisfaction include; burglar bars on the windows with a MS of 3.35, handrails on the stairs with a MS of 3.13, stairways

illuminated with a MS of 2.87, electric wires protected with a MS of 2.79, tiles on the floor (not lifting and no cracks) with a MS of 2.80 and walls painted with a MS of 2.68. Furthermore, respondents expressed a feeling of 'dissatisfaction' with the following building safety measures in the SHFs: walls plastered (no cracks), showers (without leakage), indoor ventilation and burglar bars on the doors with MS ranged between 2.55 and 2.10. However, respondents were extremely dissatisfied with toilet facilities for disabled students with a MS of 1.67 and lifts for disabled students in the SHFs with a MS as low as 1.57. The building safety measures that fell within averagely satisfied were covered indoor water mains/manholes with a MS of 3.31 and covered outdoor water mains/manholes with a MS of 3.27.

A study conducted by Rodriguez *et al.* (2013: 45), which investigated risk and protective factors in the University of South Africa, equally exposed building safety deficits such as broken windows, cracks on the walls, leaking showers and missing ceiling in university hostels. The observation and interview conducted also established the evidence of cracks in the hostel walls and lack of wall-mounted heaters in some residences. According to the safety officer, students often improvised the use of stoves to generate heat during winter, which often result in fire outbreaks especially those flats that lack a wall-mounted heater in the SHFs. The interview conducted further indicated that though lifts were not provided in the residences, this was due to the fact that disabled students were placed on the ground floor in the SHF for safety purpose. Andrew and Muckett (2007: 207) emphasised that a fundamental aspect of any means of escape in multi-storey buildings is the availability of sufficient numbers of adequately wide, unobstructed and protected stairways and not a lift except in certain conditions.

#### **4.5.7.5 Other/general safety measures**

Regarding the satisfaction of students with general safety measures in the on-campus SHFs, as depicted in Table 4.7, the MS obtained were in the range of 3.76 (highest) and 1.98 (lowest). The general safety measure that fell within student satisfaction was on-campus health clinic with a MS of 3.76 and lawn maintenance with a MS of 3.66. On the other hand, students perceived waste bin facilities, barricades for ongoing construction, waste disposal area as well as cleaning around the hostel as being of average satisfaction, with MSs ranging from 3.32 to 3.08. The MS obtained for accident log, first-aid box and emergency medically trained personnel on post are indicative that respondents were not satisfied. The MS obtained ranged from 2.13 and 1.98. On-campus health clinic had the highest MS of 3.76 which indicates a level of satisfaction, though observation and the interview indicated that the on-campus health clinic did not offer 24-hour services at university A. This calls for university attention.

#### **4.5.7.6 Summary of findings for university A**

##### **4.5.7.6.1 Level of provision**

As portrayed in Table 4.4 above, the average MS obtained for the level of provision of security measures and fire safety measures were 2.29 and 2.38 respectively. This indicates that security measures and fire safety measures were 'poorly provided' across the SHFs at university A. There is a need for the university to concentrate on how to improve security and fire safety measures in the SHFs. The average MS obtained for the level of provision of traffic safety measures, building safety measures, and general safety measures were 3.02, 2.72, and 3.09 respectively. This implies that traffic safety measures, building safety measures and general safety measures were perceived as 'somewhat provided' in the on-campus SHFs. The university needs to focus on improving these measures to eradicate the safety lapses.

##### **4.5.7.6.2 Level of importance**

As depicted in Table 4.5 above, the average MS obtained for the level of importance students attached to security measures, fire safety measures, traffic safety measures, building safety measures and general safety measures were all above 4.30. This implies that students perceived all these measures as 'extremely important' to guarantee safety in the on-campus SHFs. This also implies that the university management, facility managers and resident coordinators must ensure adequate provision of these measures considering their importance level to stakeholders (students).

##### **4.5.7.6.3 Level of risk**

The overall MS obtained for the level of risk students attached to the absence of security measures, fire safety measures, traffic safety measures, building safety measures and general safety measures is an indication that students acknowledged that their absence could be of a very high risk in the on-campus SHFs. The result obtained are as follows: lack of security measures with average mean score of 4.26, lack of fire safety measures 4.42, absence of traffic safety measures 3.90, lack of building safety measures 4.34 and lack of general safety measures 4.45. From the average MS obtained for the level of risk of absence of these measures, university could not afford to bear the risk, and as such effort should be made to provide necessary safety and security measures in the on-campus SHFs to ensure safety of facility users (see Table 4.6 above).



#### 4.5.7.6.4 Level of satisfaction

The average MS for the students' satisfaction level with the performance of security measures, fire safety measures, traffic safety measures, building safety measures and general safety measures were presented in Table 4.7 above. The average MS established that only traffic safety measures 3.27, general safety measures 3.01 and building safety measures 2.63 fell within the range of average satisfaction. On the other hand, the majority of the respondents across the SHFs expressed a feeling of dissatisfied about security measures 2.39 and fire safety measures 2.34. None of these measures fell within student satisfaction despite their level of importance and the risk their absence could pose in the SHFs. The university should consider the importance students attached to these measures and the risk of absence to make necessary safety improvement in the on-campus SHFs. This is paramount because SHFs are an integral component of university physical infrastructure, which contributes in promoting the learning experience of students and enhances their safety on campus.

#### 4.5.7.7 Improvement priority areas

A comparison between the importance and provision, the importance and satisfaction as well as the risk and provision are provided to guide the development of an improvement priority.

Table 4.8: Importance and provision relationship (university A)

Measures required to guarantee safety in the SHFs	Importance Average Means	Provision Average Means	Mean Difference
Other/general safety measures in the SHFs	4.63	3.09	-1.54
Fire safety measures in the SHFs	4.57	2.38	-2.19
Building safety measures in the SHFs	4.52	2.72	-1.08
Security measures in the SHFs	4.46	2.29	-2.17
Traffic safety measures in an on-campus SHFs	4.31	3.02	-1.29
Mean average	4.49	2.07	

Table 4.9: Importance and satisfaction relationship (university A)

Measures required to guarantee safety in the SHFs	Importance Average Means	Satisfaction Average Means	Mean Difference
Other/general safety measures in the SHFs	4.63	3.01	-1.62
Fire safety measures in the SHFs	4.57	2.34	-2.23
Building safety measures in the SHFs	4.52	2.63	-1.89
Security measures in the SHFs	4.46	2.36	-2.01
Traffic safety measures in an on-campus SHFs	4.31	3.27	-1.04
Mean average	4.49	2.72	

Table 4.10: Risk and provision relationship (university A)

Measures required to guarantee safety in the SHFs	Risk. Average Means	Provision. Average Means	Mean Difference
Other/general safety measures in the SHFs	4.45	3.09	-1.36
Fire safety measures in the SHFs	4.42	2.38	-2.04
Building safety measures in the SHFs	4.03	2.72	-1.31
Security measures in the SHFs	4.26	2.29	-1.98
Traffic safety measures in an on-campus SHFs	3.90	3.02	-0.88
Mean average	4.21	2.07	

The level of provision, level of importance, risk of absence and level of students' satisfaction with performance/functionality of security, fire safety, traffic safety, building safety and general safety measures in the on-campus SHFs were thoroughly analysed and discussed. Based on the findings, measures that require improvements in each category are provided below;

- ✦ **Security measures:** as indicated by the average MS, security measures should be given the first priority in the SHFs, considering the level of importance students attached to it and compared to its level of provision in the SHFs. The specific measures that required adequate attention within the security category include; CCTV, weapon detector, electronic coded locks on the doors at the hostel, access control with functional smart card, security patrol around the hostel, security alarm to sensitise in case of emergency and notice board for displaying security policies in the residences. The interview and observation also support security measures as the first improvement priority in the SHFs. Students' satisfaction level was also low with performance of security measures.
- ✦ **Fire safety measures:** as depicted in Table 4.7, fire safety measures appear to be the second most pressing measure that requires improvement. More particularly, measures such as smoke detectors, emergency protocol posters on the wall, emergency helpline, water sprinkler system, evacuation fire drills, fire alarm, emergency exit, fire assembly point and fire safety sign are the fire safety measures identified by the majority of respondents that require attention. The interview and observation also suggest the improvement ranking.
- ✦ **Building safety measures:** according to the overall MS, building safety measures appear to be third on the priority list. The specific area of concern includes leaking showers, absence of air conditioning, lack of disabled toilet facilities in most of residences, absence of burglar bars on the doors, and lack of a lift for disabled students in the SHFs. The interview and observation confirmed these safety lapses in the SHFs.

- ✦ **Traffic safety measures:** traffic safety measures were ranked fifth. The few areas of concern include lack of tags for vehicles, poor vehicle access control, lack of guards to monitor vehicles, and absence of traffic lights. Observation and interview also confirmed that traffic safety measures were the least deficient and could hardly pose a threat to the students living on campus as the university had already made some improvement on traffic safety measures on campus.
  
- ✦ **Other/general safety measures:** general safety measures were ranked fourth on the improvement priority list. The overall mean score obtained for general safety measures was a bit higher than that of traffic safety measures. The areas of concern include accident log, first aid-box, and emergency medically trained personnel in the SHFs. Observation and interview also elaborate that the university has better provision for general safety measures in the on-campus SHFs than security and fire safety measures.

## **4.6 Description of university B**

University B is a public university located in the Bellville suburb of Cape Town. The university was established in 1960 by the South African government as a university for Coloured people only. Before the end of apartheid in 1994, the university has been an integrated and multiracial institution. The SHFs on campus are a mixture of university SHF and privately managed SHFs. A total of seven on-campus SHFs are under the management of the university. Therefore, all the on-campus SHFs which are owned and managed by the university were included in the survey. The majority of SHFs in the university are also old buildings, older than 25 years. Most of these SHFs are of 200 bed capacity.

### **4.6.1 Observation of university B**

The condition of the SHFs was also observed to identify safety measures that are provided across the university on-campus SHFs. Observations was made to complement the data provided by the students, as well as information gathered from the SHE representative. This process also helped to gain a deeper understanding of what has been studied. The observations took place for a period of one week from; Monday 22nd April to Friday 26th April 2019. This was possible after the ethical clearance was submitted to the concerned university and a permission letter was granted to the researcher from the institution. The results of the observations are presented below.

### **4.6.2 The results of the observations**

#### **4.6.2.1 General overview**

The SHFs at university B are also built with bricks, the interior walls are plastered and painted as well. The majority of SHFs are multi-storey buildings and the bed capacity varies. The SHFs at this university appears to be very stable structurally and sited in a specific location on campus. However, there is little evidence of cracks in the interior walls, but there was damage to ceilings on the second floor in some of these residences.

#### **4.6.2.2 Security measures**

The observations revealed that the majority of the SHFs at this university have CCTV. However, weapon detectors at security checkpoints at the residences and electronic coded locks on the doors were lacking. Additionally, it was observed that lighting was adequate and well provided during night. It was also observed that security guards at the entrance of the SHFs at this university are more consistently on duty. The major point of concern identified during observation was access control. Though the majority of the SHFs at university B have

security gates, not all are controlled by functional smart card. The absence of functional smart card access control in some of these residences can allow strangers to gain free access to the SHFs, especially during the shift time when security guards exchange duties. This could be of high risk to the students residing in the SHFs.

#### **4.6.2.3 Fire safety measures**

The majority of residences at university B have fire extinguishers which are supposed to be wall-mounted; however, it was observed that fire extinguishers were lying on the floors and behind the doors. Only a few residences maintained their fire extinguishers properly. It was observed that fire alarms, smoke detectors and fire safety signs are adequately provided and in good working condition. It was also observed that fire safety measures such as fire hose reels, fire hydrants, fire assembly point and electrical outlets and switches are well provided in the majority of SHFs. Fire safety measures that are not provided across the SHFs include water sprinklers, emergency helpline and emergency protocol poster on walls.

#### **4.6.2.4 Traffic safety measures**

It was observed that campus roads that connects to the SHFs are safe for vehicles. Likewise, traffic safety measures such as traffic signs e.g. drop off/pick up zone, parking for disabled people and speed bumps are well provided. It was also observed that traffic safety measures which include vehicle access control at the main entrance to the campus and guards to monitor vehicles are well provided. However, improvement is needed in the area of pedestrian crossing to the SHFs, parking spaces, tags for vehicles as well as traffic lights on campus.

#### **4.6.2.5 Building safety measures**

It was observed that the majority of the SHFs appears more stable structurally and have burglar bars on the windows though burglar bars are not evident on the doors. The interior walls are plastered and painted though, there is evidence of peeling and cracks in some residences. Both outdoor water mains/manholes and indoor water mains/manholes were well covered. The main point of concern in relation to building safety measures at university B include lack of lifts for disabled students, evidence of cracks on the walls and absence of certain safety measures inside the disabled toilet facilities e.g. emergency telephone to rescue the disabled students in case of emergency occurrences.

#### **4.6.2.6 Other/general safety measures**

It was observed that; on-campus health clinic, waste bin facilities, cleaning around the SHFs and lawn maintenance are well provided at this university. However, it was noticed that the

on-campus health clinic does not offer 24-hour services to students. It became evident that improvement is needed in the provision of well-equipped first-aid boxes, accident log and emergency medically trained personnel to handle emergencies in the SHFs.

## **4.7 Interview**

### **4.7.1 General safety measures on campus and in the SHFs**

The safety officer stated that his role is to ensure safety and compliance. He stated: 'As safety officers, what we do is safety compliance inspection, but at this present moment we haven't done any safety inspection on campus or residence per se for a while but now because we are focusing mostly on SHFs, I will only go to SHFs (residence) if there is any request to come and inspect'. The safety officer indicated that as part of general safety measures on campus, before any construction project can take place within the SHFs or in the campus environment, the project manager or contractor must first meet certain requirements according to the Occupational Health and Safety Act. The safety officer further clarified that assurance of a safe work environment had to be provided by the contractors such as necessary safety measures to ensure that the sections on campus where construction would take place would be barricaded. Likewise, contractors must provide safety files in order to check necessary safety requirements.

### **4.7.2 Security measures put in place in the SHFs**

In terms of security guards at the entrance of SHFs, the safety officer stated that security guards often require training and retraining. The interviewee further indicated that in his six-year experience in the institution, he understood that the security company often replaced security guards in the SHFs. The safety officer highlighted the implications which include lack of training mostly for the new security guards, while some of these security guards did not understand their role and responsibilities. This has created a huge gap and contributed to security issues in the SHFs. The safety officer clarified that security personnel should be well-trained and ensure that they understand their roles and responsibilities.

The safety officer stated that there was a project that was undertaken in 2018 where a smart card system was introduced but it was not in place in all the residences. The fire coordinator reported that access control with functional smart card was only in place in about three residences. In terms of CCTV in the SHFs, the fire coordinator indicated that the university have a lot of them in the strategic places on campus and is monitored by campus protection. He further clarified that, in terms of the residences, the flow of the residences is being monitored, however, improvement is needed in some crime areas, there is need for more

CCTV and at least a security guard should be posted for monitoring. The respondent also pointed to other challenges and safety gap associated with the CCTV in place on campus. The CCTV provided were not night vision, and at night, students needed to study, some went to the library and because academic areas were a little bit far from the SHFs, it was difficult to monitor their movement at night. Therefore, the safety officer suggested that the university needed to improve in this aspect especially at night be it across the field and in between the residences.

Security checkpoints at the entrances of SHFs were provided and that is where the security guard was stationed, one at the entrance, the other patrolling the residences. Security supervisors were expected to do hourly checks. In terms of security patrol around the hostel especially at night, the officers indicated that security supervisors at each residence did hourly checks. There were electronic coded locks on the door to the rooms in only three of the SHFs, which needed improvement. There was no specific fencing around the SHFs, and only one residence had a fence around it because it was isolated.

The safety officers indicated that lighting at night in and around the SHFs was adequate, especially inside the residences but often certain lights went out and maintenance needed to improve on lighting on campus. The officers stated that for students to walk safely at night in between the SHFs and on campus, the university needed to improve on the provision of adequate lighting on campus and provision should be made for emergency line with telephones on campus roads for easy access to students if need be. He clarified that 'we aim to add more lights on campus and around the hostels especially not so much power consuming lightings so there is that challenge in terms of the cost and in terms of the requirement to ensure that students are safe'. The respondents added that monetary assistance had been challenging.

The respondents stated that weapon detectors at security checkpoints to the residences was lacking, however, a written policy prohibiting vandalism was provided in the SHFs in form of rules and regulations guiding the residents. The policy included no smoking and no drinking of alcohol in the SHFs. It was difficult to manage these policies because students have privacy in their rooms but if they are caught, they are dealt with. The officer further stated that provision was made for notice boards displaying security rules and regulations such as gun policies and the use of alcohol, etc.

#### **4.7.3 Fire safety measures put in place in the SHFs**

The fire coordinator stated; 'university aim to get 100% fire compliance as per legislation, and so with regards to that we do have firefighting appliances in the residences and they are

specified at certain distances as per regulations, we also have fire detection in the residences to warn us of early fire'. He also stated that students were trained in first aid and fire evacuation whilst the security guards were trained in firefighting as well as evacuation so that they could activate alarms for safe evacuation in the event of fire.

The fire coordinator further stated that as part of compliance, there was provision for firefighting equipment and fire alarms that are linked to the fire detection system, which requires yearly servicing in order to ensure they are in good working condition. Likewise, some of the buildings had a sprinkler system and that is also part of compliance while some other areas require gas suppression. Apart from these firefighting devices, there was a need to talk about the human factor in the SHFs. The fire coordinator explained that the majority of students living in the on-campus SHFs came from different background and different communities with different exposure. As a result, understanding of fire equipment put in place could be very new to students coming into student housing.

One of the major challenges was students misusing these fire safety measures or equipment mounted on the wall; there was a lot of misbehaviour from students, for instance spraying fire extinguishers just for fun of it, to see what this did and often irritating other student in the room when they sprayed under their doors.

The officer further clarified that many of the issues occurring in the SHFs is largely due to lack of the understanding in terms of what the student roles are in terms of maintaining fire compliance and of the law because, tampering with fire life safety equipment is a criminal offence. Students often went against compliance of fire safety measures provided.

Moreover, one of the challenges in the SHFs was students who often misused alcohol, and the student life environment especially during weekends; it was extremely difficult even for security personnel to manage student safety. Sometimes students activated fire alarms because they were in party mood when others were sleeping, and some wanted to create a bigger party so was quite difficulty to maintain fire compliance because was not just compliance but it was an engagement of everybody and just like a chain, if you break one everyone might be in a lot of danger.

Furthermore, the fire coordinator stated that 'we encounter fire challenges in winter time. In the rooms in winter time, students are not supposed to have their own heaters because there are wall-mounted heaters in the rooms already, but they bring their own heaters even the stoves into the rooms and they use those as heater in winter time and they go and sleep and the wind plays with the curtain and in that manner they are sleeping and by the time they wake up they complain oh my feet get hot but it was the curtain burning so there is a lot of compliance that we struggle to maintain and is largely by students breaking the rules'. The safety officer



mentioned that although this is the responsibility of the security and house coordinators, but students have cunning means of hiding things, a culture that was created because students believe they know better until something really goes wrong.

The researcher probed further and told respondent that, from their explanation it could be deduced that most of fire-related challenges in the SHFs were largely associated with student lifestyle and misuse of firefighting equipment by the students. So, in that regard, was there any fire safety education or training for the students residing in the SHFs?

According to fire coordinator, there was an orientation process for first year students. Various teams would meet to orientate students which was done this year but the previous year they actually did educational discussions with the first-year students to inform them about regulations and compliance, and to explain if they misused the fire equipment it would have an impact on their safety. The safety officers further explained that he demonstrated how to approach fire safely, like how to utilise fire extinguisher, how to pull the pin, how to aim, squeeze and sweep the extinguisher and how to keep one's back towards the exit and if the fire was too big, to get out and sound the alarm

The fire coordinator pointed to other areas of challenge, where improvement was needed. He stated, 'for the couple of years since we came back from #FeesMustFall, to get all fire safety measures in place has been really difficult because we as the university we are still recovering from psychological damages that came from that which has brought huge safety gap in the SHFs and entire campus environment'.

In terms of fire extinguishers of the correct type, the respondents stated that university have dry chemical powder and CO<sub>2</sub> fire extinguishers and fire blankets. According to the safety officer, challenges lay with issue of theft, as people do steal fire safety equipment because they are portable and nice. There were smoke detectors linked to the alarms, largely in kitchens and in the passages but there were no smoke detectors in any rooms because students covered them up and smoke in the rooms. The officer stated that since he arrived on campus, no smoke detectors were present in the rooms. He stressed that it would have been ideal to have smoke detectors in the rooms but they were in the passages because the expectation was that students would not cook in the rooms; however, they do which formed part of challenges. In terms of evacuation fire drills, the fire coordinator stated that the aim was to have them at least twice a year but that year they had not had any. The safety officer pointed out issues with electrical outlets and switches in the SHFs, and the fire coordinator stated that the university had an electrical department that dealt with electrical fittings and appliances in the hostel which were guided by South African Building Standard (SABS); unfortunately some of these plugs which were not SABS approved easily got burnt not

because of power supply but the maintenance of the electricity within the conductor of plug as they were largely made of recycling materials and it was extremely difficult to control because students looked for cheap products without considering the side effects.

#### **4.7.4 Response to traffic safety measures in the on-campus SHFs**

The respondents stated that provision for pedestrian crossing was made. During the peak hours, traffic officials assisted students in crossing. In terms of parking space for the students and visitors in the residences, the officer indicated that there were parking areas at the residences. He also added that the 'university have transport bus service and they are heavy vehicles so annually we have to repair the potholes especially in the areas that lead to the contractor's' gate'.

The researcher asked if there was no obstruction in the parking area in the hostels and if there was provision for parking for disabled student. The respondents stated that provision was made for massive parking though during the day it was busy. There were speed bumps and various traffic signs. The interviewer inquired if respondents thought there was a need for traffic lights on campus. The safety officer stated, 'Yes, it would be awesome to have it especially at our T-junctions but at the moment we don't have it'. He also indicated that provision was made for intersections with traffic officials and circles. Finance was once again highlighted a challenge.

#### **4.7.5 Response to building safety measures put in place in the SHFs**

In terms of building safety measures in the SHFs, the health and safety officer stated that there was provision for burglar bars on the windows mostly on the ground floor though not on the doors. He further indicated that the walls were plastered and painted. However, the officer pointed out the areas of challenge in the SHFs buildings such as evidence of cracks on the walls in certain residence sections, absence of lifts for the disabled students, lack of disabled toilet facilities in some SHFs, and absence of certain safety features in the disabled toilet facilities.

According to fire coordinator, there was no lift for the disabled students because they were mostly housed on the ground floor, and largely at a particular residence. The officer further explained that there was special care given to the disabled students in one of the SHFs because of the location and the freedom of movement or limitations these students had. He stated that 'Most of disabled students are currently placed at Chris Hani residence at the ground level'. He however admitted that a lot had to be done and further noted that they were working with the disability unit to further enhance the support that these students might need. He pointed out that there were a variety of students with different disabilities such as hearing-

impaired students, and different illnesses including epilepsy. The safety officer was also of the opinion that the university needed to improve in those areas. In terms of indoor ventilations, the respondents indicated that SHF rooms had windows to accommodate natural ventilation. However, there was no artificial ventilation like air condition in the university student housing rooms. This also needs improvement in terms of provision.

#### **4.7.6 Response to general safety measures on campus and in the SHFs**

In terms of first aid box and medically trained emergency personnel in the SHFs, the safety officer stated that there were first aid boxes and the security officers were mostly trained to assist, otherwise they would call their supervisor to render immediate assistance to the students if need be. There was an on-campus clinic, though not with 24-hour service. In case of emergency at night there was an ambulance service that the university subscribed to which would take the students to the most appropriate facility.

Researcher asked whether there were accident logs in each SHF. The respondent stated that the plan in place was that security guards would log every incident and the university had 9111 centre campus protection. This centre had 'chase reports' so every incident was recorded digitally and the safety officers would get an alarm when students got sick, fell or slipped, in order to render immediate assistance. So, there was 24 hr capturing of incidences. The respondent commented on the age of residences; it was stated that there were two new SHFs and others were older than 20 years, which is an indication that maintenance and safety improvement was required.

#### **4.8 Responses to the research questionnaire by the respondents**

Data was also collected through a questionnaire survey method. A total of 220 questionnaires were administered to students residing in the on-campus SHFs which directly belongs to university B. A total of 192 questionnaires were returned. However, 23 of the questionnaires were returned void. Therefore, a total of 169 questionnaires were found to be properly completed and analysed. The questionnaires were purposely delivered to students who have lived at least one (1) year in the residence. The intention was to ensure that respondents who had a better understanding of safety issues at their various residences are involved in the survey. Below is the presentation of the analysis from university B.

#### **4.9 Profile of respondent at university B**

Table 4.11 indicates that 45.6% (77) of the respondents are male while 54.4% (92) are female. 87.6% (148) are undergraduate students. 12.4% (21) are postgraduate masters and PhD students. 47.9% (81) of the respondents have been living in the residence for 3 years and

above, 52.1% (88) for 2 years and 0% respondent from year one. There were more respondents who have lived for 2 years and above in the hostel which is a good indication that the majority of the respondents at university B also have a better experience with the SHFs. 26.6% (45) of the respondents are Coloured, 72.8% (123) are Black and 0.6% (1) represents white. This is quite similar to the demographics of the respondents at university A, which might also be relocation factor.

Table 4.11: Profile of respondent at university B

Gender	Respondents	Percentage (%)
Male	77	45.6
Female	92	54.4
<b>Total</b>	<b>169</b>	<b>100</b>
<b>Level of study</b>		
Undergraduate	148	87.6
Postgraduate	21	12.4
<b>Total</b>	<b>169</b>	<b>100</b>
<b>Years of living in the hostel</b>		
3 years & above	81	47.9
2 years	88	52.1
1 year	0	0
<b>Total</b>	<b>169</b>	<b>100</b>
<b>Race</b>		
Coloured	45	26.6
Black	123	72.8
White	1	0.6
<b>Total</b>	<b>169</b>	<b>100</b>
<b>Age group</b>		
Under 20 years	6	3.6
20 – 25 years	145	85.8
26 – 30 years	11	6.5
31 – 35 years	1	0.6
Over 36 years	6	3.6
<b>Total</b>	<b>169</b>	<b>100</b>

The fact that the majority of the black students come from other provinces (Eastern and Northern Cape Province), could limit their options and necessitate their living in the on-campus residence. The age of the respondents who partook in the study also ranged from under 20 years (3.6%), 20 – 25 years (85.8%), 26 – 30 years (6.5%), 31 – 35 years (0.6%) and more than 36 years (3.6%). Respondents who are 20 – 25 years of age showed the highest percentage of 96.4% which signified that the majority of the respondents were adult and mature students.

#### 4.10 Testing for the reliability of questions used for university B

The purpose of using Cronbach's alpha coefficient in this study was to check the reliability of the scale questions. The Cronbach's alpha coefficient of the scale questions for this study was 0.85% average. Nieuwenhuis (2007: 71) indicated that 0.80 could be used as a rule of thumb to represent a sustainable level of internal reliability. This implies that the scale questions and variables used were strongly reliable. The full Cronbach's alpha coefficient table is presented in the Table 4.12.

Table 4.12: Summary of reliability test at university B

Question No.	Statement	Number of items	Cronbach's alpha coefficient
Section B1	Level of provision of security measures in the SHFs	13	0.82
Section B2	Level of provision of fire safety measures in the SHFs	13	0.74
Section B3	Level of provision of traffic safety measures in an on-campus SHFs	11	0.75
Section B4	Level of provision of building safety measures in the SHFs	14	0.71
Section B5	Level of provision of other/general safety measures in the SHFs	11	0.80
Section C1	Level of importance of security measures in the SHFs	13	0.89
Section C2	Level of importance of fire safety measures in the SHFs	13	0.94
Section C3	Level of importance of traffic safety measures in an on-campus SHFs	11	0.89
Section C4	Level of importance of building safety measures in the SHFs	14	0.90
Section C5	Level of importance of other/general safety measures in the SHFs	11	0.91
Section D1	Level of risk with lack of security measures in the SHFs	13	0.83
Section D2	Level of risk with lack of fire safety measures in the SHFs	13	0.93
Section D3	Level of risk with lack of traffic safety measures in an on-campus SHFs	11	0.87
Section D4	Level of risk with lack of building safety measures in the SHFs	14	0.89
Section D5	Level of risk with lack of other/general safety measures in the SHFs	11	0.84
Section E1	Level of satisfaction with security measures in the SHFs	13	0.89
Section E2	Level of satisfaction with fire safety measures in the SHFs	13	0.87
Section E3	Level of satisfaction with traffic safety measures in an on-campus SHFs	11	0.81
Section E4	Level of satisfaction with building safety measures in the SHFs	14	0.88
Section E5	Level of satisfaction with other/general safety measures in the SHFs	11	0.80

#### 4.11 Data analysis for university B

##### 4.11.1 Provision of different measures to ensure SHF safety at university B

Table 4.13 presents the level of provision of security measures in the SHFs, ranked on a 5-point Likert scale where 1 = Not provided, 2 = Poorly provided, 3 = Somewhat provided, 4 = Provided and 5 = Well provided.

Table 4.13: Level of provision of different measures to ensure SHF safety at university B

Factors measured	Response (%)					Mean Score	Rank	
	Unsure	Not provided.....Well provided						
		1	2	3	4			5
<b>Security measures</b>								
Security guard on post	0	0	1.8	4.7	21.9	71.6	4.63	1
Lighting at night in/around the hostel	0	0.6	1.2	7.1	33.7	57.4	4.46	2
Security checkpoints	0	1.2	3.6	11.2	33.7	50.3	4.28	3
Fencing around the hostel	0.6	6.5	0	11.8	29.6	51.5	4.20	4
Access control with functional smart card	1.8	4.7	1.2	5.3	49.7	37.3	4.15	5
Security patrol around the hostel	3.6	0.6	3.0	21.9	29.6	41.4	4.12	6
Security alarm	5.3	5.3	7.1	13.6	26.0	42.6	3.98	7
Security signs	2.4	5.3	8.3	20.1	29.0	34.9	3.81	8
Electronic coded locks on the doors	1.8	24.3	4.7	9.5	3.6	56.2	3.63	9
Written policy prohibiting vandalism	5.3	5.9	4.7	33.1	27.8	23.1	3.60	10
Notice board displaying security policies	13.0	9.5	8.3	17.8	44.4	7.1	3.36	11
CCTV for monitoring	10.1	28.4	42.0	3.0	13.0	3.6	2.12	12
Weapon detector at security checkpoint	8.9	80.5	4.1	3.6	2.4	0.6	1.22	13
<b>Average mean score</b>							<b>3.66</b>	
<b>Fire safety measures</b>								
Fire extinguishers	0.6	1.2	0.6	3.0	51.5	43.2	4.35	1
Emergency help lines	3.0	4.1	3.0	4.1	42.0	43.8	4.21	2
Fire alarm	9.5	1.8	5.3	5.9	43.2	34.3	4.13	3
Electrical outlets and switches	6.5	0.6	5.3	7.7	51.5	28.4	4.09	4
Fire hose reels	12.4	1.8	2.4	3.6	59.2	20.7	4.08	5
Smoke detectors	14.2	3.0	3.0	16.0	32.5	31.4	4.00	6
Fire hydrants	15.4	1.8	1.8	4.7	62.7	13.6	4.00	6
Fire safety signs	20.1	2.4	1.2	14.2	38.5	23.7	4.00	6
Emergency protocol posters on the wall	2.4	7.1	3.6	16.0	42.0	29.0	3.84	7
Fire assembly point	7.7	6.5	7.1	13.6	40.8	24.3	3.75	8
Evacuation fire drills	16.0	7.1	8.3	14.2	32.5	21.9	3.64	9
Emergency exit (fire escape doors)	4.7	6.5	7.1	14.2	61.5	5.9	3.55	10
Water sprinkler system	13.6	62.7	8.3	3.6	7.7	4.1	1.63	11
<b>Average mean score</b>							<b>3.79</b>	
<b>Traffic safety measures</b>								
Parking space for students and visitors	0	0.6	1.8	16.0	24.9	56.8	4.35	1
Hostel road safe for vehicle use	4.1	1.2	2.4	16.0	23.1	53.3	4.30	2
Pedestrian crossing	5.9	4.1	1.8	5.9	32.0	50.3	4.30	2
Traffic signs	5.3	5.9	1.8	16.0	40.2	30.8	3.93	3
Speed bumps	0	8.9	2.4	8.9	53.3	26.6	3.86	4
Vehicle access control	8.3	8.9	6.5	5.9	50.3	20.1	3.72	5
Guard for vehicle monitoring	7.7	11.2	5.3	5.9	56.2	13.6	3.60	6
Unobstructed parking area	7.7	1.2	6.5	55.0	15.4	14.2	3.37	7
Parking for disabled	39.1	11.8	3.0	16.6	13.0	16.6	3.32	8
Tags for vehicles	14.2	10.7	50.9	13.0	6.5	4.7	2.34	9
Traffic lights	5.3	80.5	8.3	2.4	3.6	0	1.25	10
<b>Average mean score</b>							<b>3.49</b>	

Continuation of Table 4.13.

Factors measured	Response (%)					Mean Score	Rank	
	Unsure	Not provided.....		Well provided				
		1	2	3	4			5
<b>Building safety measures</b>								
Covered outdoor water mains/manholes	16.6	2.4	0.6	4.1	31.4	45.0	4.39	1
Burglar bars on the windows	0.6	3.6	2.4	13.0	13.6	66.9	4.38	2
Covered indoor water mains/manholes	22.5	2.4	0	4.7	30.2	40.2	4.36	3
Tiles on the floor (not lifting & no cracks)	0	0.6	7.1	14.2	23.1	55.0	4.24	4
Walls painted	0.6	0.6	2.4	17.2	41.4	37.9	4.14	5
Electric wires protected	1.2	4.7	4.7	13.0	36.7	39.6	4.02	6
Handrails on the stairs	0.6	7.7	3.0	5.3	52.1	31.4	3.97	7
Stairs ways illuminated	3.6	11.8	3.6	3.0	52.1	26.0	3.79	8
Walls plastered (no cracks)	0.6	5.9	4.1	33.7	24.3	31.4	3.71	9
Indoor ventilation	5.9	2.4	3.0	33.7	42.6	12.4	3.63	10
Showers (without leakage)	0	1.2	8.3	46.7	21.3	22.5	3.55	11
Disabled toilet facility	8.9	58.0	7.7	11.8	10.1	3.6	1.83	12
Lift for disabled students	8.3	77.5	5.9	0.6	5.3	2.4	1.35	13
Burglar bars on the doors	1.2	85.8	4.7	0.6	3.6	4.1	1.33	14
Average mean score							3.48	
<b>Other /General safety measures</b>								
Waste bin facilities	1.2	1.2	1.2	4.1	23.1	69.2	4.59	1
Waste disposal area	4.7	0.6	1.8	4.1	24.9	63.9	4.57	2
Barricades for ongoing construction	1.8	0.6	0.6	5.9	27.8	63.3	4.55	3
Cleaning around the hostel	0	0	1.8	4.7	30.2	63.3	4.55	3
On-campus health clinic	1.2	1.2	2.4	3.6	26.6	65.1	4.53	4
Lawn maintenance	0.6	0.6	3.0	4.1	31.4	60.4	4.48	5
Hostel environment free from stagnant water	7.1	0	2.4	11.8	20.1	58.6	4.45	6
Protected excavations around the hostel	7.7	1.2	0	7.1	33.1	50.9	4.43	7
Accident log	28.4	7.7	51.5	3.0	5.3	4.1	2.25	8
Emergency medically trained personnel	50.3	18.9	18.3	5.9	4.7	1.8	2.03	9
First-aid box	42.6	23.1	20.1	5.3	7.7	1.2	2.02	10
Average mean score							3.86	

#### 4.11.1.1 Security measures

Ranking by the MS of responses as indicated in Table 4.13, security guard on post was ranked first as the most provided security measure with a MS of 4.63, lighting at night in/around the hostel was ranked second with MS of 4.46, ranked third was security checkpoints at the entrance of the SHFs with MS of 4.28 and fencing around the hostel was ranked fourth with MS of 4.20. The MS obtained indicated that the aforementioned security measures were 'well provided' in the SHFs. The findings further reveals that access control with functional smart card with a MS of 4.15, security patrol around the hostel with a MS of 4.12, security alarm to sensitise in case of emergency with a MS of 3.98, security signs for warning with a MS of 3.81, electronic coded locks on the doors at the hostel with a MS of 3.63, written policy prohibiting

vandalism with a MS of 3.60, and notice board displaying security policies with a MS of 3.36 were security measures that respondents rated as 'provided' in the SHFs.

The security measure with a notable number of responses recorded as poorly provided was CCTV for monitoring with a MS of 2.12, whereas respondents rated weapon detectors at security checkpoint at the residence entrance with MS of 1.22 as the most lacking/not provided security measure in the SHFs. Observation and the interview conducted by the researcher also established the lack of weapon detectors at security checkpoints at the hostel entrances and inadequate CCTV in the SHFs. Although access control with functional smart card and lighting at night were highly ranked, the interview indicated that these areas also need some form of improvement. Tanner-Smith *et al.* (2018: 104) commented that adequate provision of visible security measures on campus such as CCTV cameras would prevent crime and violence by minimising the presence of offenders in and around university environment.

#### **4.11.1.2 Fire safety measures**

Also, Table 4.13 above portrays the MS obtained for the level of provision of fire safety measures in the SHFs. The MS obtained ranged from 4.35 (fire extinguishers – the highest) and 1.63 (water sprinkler system – the lowest). Fire extinguishers, emergency helplines, fire alarm, electrical outlets and switches, fire hose reels, smoke detectors, fire hydrants, fire safety signs evacuation fire drills, fire assembly point, emergency protocol posters on the wall and emergency exit (fire escape doors) fell within 'Provided' range. The MS for the aforementioned fire safety measures were above 3.55. Only the water sprinkler system with a MS of 1.63 was ranked as 'Not provided' in the SHFs. None of the fire safety measures was ranked as 'somewhat provided'.

The interview with fire safety officer revealed that although most of fire safety measures were provided in the SHFs, student's lifestyle (human factor) such as damaging and misuse of firefighting equipment has been a major challenge. According to Agyekum *et al.* (2016:54), an increase in fire related issues in the hostel accommodation has been traced to lack/poor performance of fire safety measures and mishandling of fire safety equipment in university dormitories. Thus, it is imperative that an effort is made to manage the student's lifestyle since bad habits could lead to fire even if fire safety equipment is provided.

#### **4.11.1.3 Traffic safety measures**

Table 4.13 above further reveals the level of provision of traffic safety measures in the on-campus SHFs. The MS obtained for the majority of the traffic safety measures is an indication that respondents were more pleased with the level of provision of traffic safety measures.



Ranked by the mean score of responses, parking space for students and visitors with a MS of 4.35, hostel road safe for vehicle use with a MS of 4.30, pedestrian crossing with a MS of 4.30, traffic signs with of MS 3.93, speed bumps with a MS of 3.86, vehicle access control with a MS of 3.72, and guards for vehicle monitoring with MS of 3.60 were the traffic safety measures ranked by the respondents as 'well provided' and 'provided'. However, respondents ranked tags for unobstructed parking area and parking for disabled with MS of 3.37 and 3.32 respectively as 'somewhat provided'. The notable traffic safety measure that the majority of the respondents perceived as lacking was traffic lights with a MS as low as 1.25. It was actually observed that traffic lights were not provided on campus. Schwebel *et al.* (2012: 268) and Rodriguez *et al.* (2013: 47) pointed out lack of traffic safety measures such as guard for vehicle monitoring, vehicle access control and traffic lights in some highly populated institutions in South Africa. The observations, MS and interview also indicate that traffic safety measures such as tags for vehicles and traffic light needs improvement.

#### **4.11.1.4 Building safety measures**

In terms of level of provision of building safety measures in the SHFs as presented in Table 4.13 above, covered outdoor water mains/manholes with a MS of 4.39 was ranked first as the building safety measure that was well provided; ranked second was burglar bars on the windows with a MS of 4.38, ranked third was covered indoor water mains/manholes with a MS of 4.36; and tiles on the floor (not lifting and no cracks) was ranked fourth with a MS of 4.24. On the other hand, the building safety measures that the majority of respondents ranked as provided were walls painted with a MS of 4.14, electric wires protected with a MS of 4.02, handrails on the stairs with a MS of 3.97, stairs ways illuminated with a MS of 3.79, indoor ventilation with a MS of 3.63, and showers (without leakage) with MS of 3.55. Although observation and interview confirmed the evidence of cracks on the interior walls and peeling of plaster mostly in the bathroom in the SHFs. In terms of indoor ventilation, the safety officer stated that during winter period, students improvises stove to generate more heat in the residence due to insufficient wall-mounted heater in the SHFs.

Findings further stated that disabled toilet facility and lifts for disabled students were rated as poorly provided in the SHFs. Burglar bars on the doors had the lowest MS of 1.33. The mean score obtained for the burglar bars on the doors indicates that they were not provided. The interview also showed that though provision was not made for lifts for disabled students in the SHFs, disabled students were normally placed on the ground floor in a particular residence. From the responses, observations and interview conducted by the researcher, it is apparent that improvement is also needed across both universities in the area of building safety measures.

#### **4.11.1.5 Other / general safety measures**

Ranking by the MS of responses as indicated in Table 4.13 above, waste bin facilities was ranked first as the most provided general safety measure on campus at university B with a MS of 4.59, ranked second was waste disposal area with a MS of 4.57, barricades for ongoing construction was ranked third with a MS of 4.55, cleaning around the hostel was ranked fourth with a MS of 4.55, on-campus health clinic was ranked fifth with a MS of 4.53, ranked sixth was lawn maintenance with a MS of 4.48, hostel environment free of stagnant water was ranked seventh with MS of 4.45, followed by protected excavations around the hostel with MS of 4.43. The MS obtained for the aforementioned general safety measures implies that they are 'well provided'. However, first-aid box in the SHFs 2.02, emergency medically trained personnel 2.03 and accident log 2.25 had the lowest MS. The possible reason for this was established during the interview.

The safety officer confirmed that first aid-box were mostly kept with house parents, which might not be visible to students except when the need arose, and house parents were also trained as first aiders to render immediate medical attention to student before the transfer of casualty to the hospital. However, the level of training and capability of house parents to render such services was not established by the safety office.

#### **4.12 Importance of different safety measures put in place in the SHFs at university B**

Table 4.14 sought to explore the level of importance students attached to different measures put in place to guarantee safety in SHFs, ranking on 5-point Likert scale where 1 = Not at all important, 2 = Not important, 3 = Averagely important, 4 = Important and 5 = Extremely important.

Table 4.14: Level of importance of different measures put in place to guarantee safety in the SHF at university B

Factors measured	Response (%)						Mean Score	Rank
	Unsure	Not at all important.....Extremely important						
		1	2	3	4	5		
<b>Security measures</b>								
Security alarm to sensitise in case of emergency	0	0	0.6	3.6	8.9	86.4	4.82	1
Security guard on post	0	0.6	0	4.1	14.8	80.5	4.74	2
Lighting at night in/around the hostel	0	0.6	0.6	3.6	14.8	80.5	4.73	3
Fencing around the hostel	1.2	0	0.6	4.7	18.3	76.3	4.70	4
Electronic coded locks on the doors at the hostel	0.6	1.2	1.8	5.9	10.1	79.9	4.67	5
Weapon detector at security checkpoint	4.7	0.6	0.6	11.2	7.7	79.3	4.65	6
Security patrol around the hostel	0	0	1.2	5.3	23.1	70.4	4.62	7
Security checkpoints at the entrance of the hostel	0.6	0	0.6	4.7	27.2	67.5	4.61	8
Written policy prohibiting vandalism	0	0	0.6	6.5	24.3	63.9	4.59	9
Security signs for warning	0.6	0.6	0	5.3	27.8	65.7	4.58	10
Notice board displaying security policies	1.8	0	0.6	7.7	24.9	66.3	4.53	11
CCTV for monitoring	0	0	0	11.8	24.3	62.1	4.52	12
Access control with functional smart card	0	0.6	0	4.7	44.4	50.3	4.43	13
<b>Average mean score</b>							<b>4.63</b>	
<b>Fire safety measures</b>								
Fire extinguishers	0	0	0	1.8	13.0	85.2	4.83	1
Smoke detectors	0.6	0	0	1.8	13.0	84.6	4.83	1
Fire alarm	0.6	0	0	3.6	10.1	85.8	4.82	2
Emergency exit (fire escape doors)	0.6	0	0	5.9	8.3	85.2	4.79	3
Emergency help lines	0.6	0	0	6.5	10.7	82.2	4.76	4
Fire hydrants	4.7	0	0	7.1	11.2	76.9	4.73	5
Fire safety signs	0	0	0.6	3.6	18.3	77.5	4.72	6
Fire hose reels	3.6	0	0	7.1	18.9	70.4	4.65	7
Electrical outlets and switches	2.4	0	0	1.8	32.0	63.9	4.63	8
Emergency protocol posters on the wall	1.2	0	0	6.5	24.3	68.0	4.62	9
Water sprinkler system	3.0	0	1.2	3.0	27.8	65.1	4.61	10
Fire assembly point	1.2	0	1.2	8.3	19.5	69.8	4.59	11
Evacuation fire drills	1.2	0	1.2	7.7	21.3	68.6	4.59	11
<b>Average mean score</b>							<b>4.71</b>	

Continuation of Table 4.14.

Factors measured	Response (%)					Mean Score	Rank	
	Unsure	Not at all important.....Extremely important						
		1	2	3	4			5
<b>Traffic safety measures</b>								
Parking for disabled	0.6	0	0.6	3.6	10.1	85.2	4.80	1
Hostel road safe for vehicle use	3.0	0	0	4.1	25.4	67.5	4.65	2
Unobstructed parking area	4.1	0	0	3.0	30.2	62.7	4.62	3
Pedestrian crossing	0	0	0	11.2	20.1	68.6	4.57	4
Parking space	0.6	0	0	5.3	34.9	59.2	4.54	5
Speed bumps	0	0	0	11.2	25.4	63.3	4.52	6
Traffic signs	1.2	0	0	13.0	26.6	59.2	4.46	7
Vehicle access control	1.2	0	0.6	11.2	36.1	50.9	4.38	8
Tags for vehicles	8.3	0	1.2	16.6	27.8	46.2	4.29	9
Guard for vehicle monitoring	2.4	0	0.6	23.7	27.2	46.2	4.21	10
Traffic lights	2.4	1.2	1.2	15.4	40.8	39.1	4.18	11
Average mean score							4.47	
<b>Building safety measures</b>								
Lift for disabled students	0.6	0	0.6	3.0	10.7	85.2	4.81	1
Electric wires protected	1.2	0	1.2	3.0	10.7	84.0	4.79	2
Disabled toilet facility	0.6	0	0.6	2.4	14.2	82.2	4.79	2
Showers (without leakage)	0	0	0.6	6.5	20.1	72.8	4.65	3
Walls plastered (no cracks)	4.1	0	0	5.9	21.9	68.0	4.64	4
Indoor ventilation	1.8	0	0.6	3.6	26.6	67.5	4.63	5
Covered outdoor water mains/manholes	3.6	0	1.2	3.0	29.0	63.3	4.60	6
Burglar bars on the windows	0	0	0	12.4	15.4	72.2	4.59	7
Stairs ways illuminated	2.4	0	1.2	10.7	16.6	69.2	4.57	8
Covered indoor water mains/manholes	3.6	0.6	1.8	4.1	26.6	63.3	4.55	9
Tiles on the floor (not lifting & no cracks)	0	0	0	5.9	35.5	58.6	4.52	10
Walls painted	0	0	1.2	5.9	32.5	60.4	4.52	10
Handrails on the stairs	1.8	0	0.6	10.7	27.8	59.2	4.48	11
Burglar bars on the doors	0	1.2	11.8	24.9	15.4	46.7	3.94	12
Average mean score							4.58	

Continuation of Table 4.14.

Factors measured	Response (%)					Mean Score	Rank	
	Unsure	Not at all important.....Extremely important						
		1	2	3	4			5
Other / General safety measures								
On-campus health clinic	0	0	0	1.8	30.2	68.0	4.66	1
First-aid box	0	0	0	2.4	34.9	62.7	4.60	2
Cleaning around the hostel	0	0	0.6	1.2	43.8	54.4	4.52	3
Emergency medically trained personnel on post	0	0	0	6.5	36.1	57.4	4.50	4
Waste bin facilities	0	0	0.6	1.8	49.1	48.5	4.45	5
Hostel environment free from stagnant water	3.0	0	0	3.6	46.7	46.7	4.44	6
Waste disposal area	5.3	0	0	3.0	47.3	44.4	4.43	7
Accident log	4.1	0	0	7.1	40.8	47.9	4.42	8
Barricades for ongoing construction	0.6	0	0	3.6	50.9	45.0	4.41	9
Protected excavations around the hostel	3.0	0	0	5.9	54.4	36.7	4.31	10
Lawn maintenance	0.6	0	0.6	14.2	53.3	31.4	4.16	11
Average mean score							4.45	

#### 4.12.1 Security measures

It is evident from the MS obtained that respondents from university B perceived all the security measures highlighted in the Table 4.14 as 'extremely important' requirements in the SHFs. The MS obtained for all the security measures were all above 4.42. More than 94% of the respondents responded in the range of 'important' and 'extremely important' for all security measures. Security alarms with MS of 4.82 were perceived to be the most important security measure required in the SHFs, whilst access control with functional smart card was ranked as the least important with a MS of 4.43.

This implies that respondents perceived all the security measures as extremely important requirements. A study conducted on relative importance of student accommodation quality in higher education by Nimako and Bondinuba (2013:134) also discovered that security measures in the SHFs were among the first three most important measures ranked by their respondents. The average MS obtained for security measures in Table 4.14 indicates that the majority of the respondents felt that security measures in the SHFs is extremely important and provision of such measures would improve the safety of SHFs.

#### **4.12.2 Fire safety measures**

Table 4.14 above shows the level of importance of fire safety measures in the SHFs. The MS obtained demonstrate a perception of 'extremely important'. In fact, all the fire safety measures were ranked as 'extremely important'. The MS ranged from 4.83 (fire extinguishers) and 4.59 (evacuation fire drills). More than 86% responded in the range of important and extremely important. According to Agyekum *et al.* (2016: 53), provision of fire safety measures plays an important role in ensuring the safety of student housing against fire outbreak. Chen *et al.* (2012: 312) stressed that student housings are susceptible to fire due to amount of combustible materials and student lifestyle; it is therefore important that hostel providers make provision for necessary fire safety measures in the hostel.

#### **4.12.3 Traffic safety measures**

In Table 4.14 above, the MS obtained indicate that traffic safety measures are an important factor that contributes to safety of the on-campus SHFs. The MS obtained ranged from 4.80 for parking for disabled (highest) to 4.18 for traffic lights (lowest). The MSs obtained signify that all traffic safety measures highlighted in the table fell within 'extremely important'. Schwebel *et al.* (2012: 268) observed that in order to prevent accidents on campus, it is important to make provision for traffic safety measure on campuses and nearby highways. It can be assumed from the overall mean score obtained that respondents ranked all the traffic safety measures as extremely important in the on-campus SHFs. The interview with safety officers also established the importance of adequate traffic safety measures in the on-campus SHFs.

#### **4.12.4 Building safety measures**

Apart from burglar bars on the doors, respondents perceived all building safety measures in Table 4.14 above as 'extremely important' measures that will improve the safety in the SHFs if provided and maintained. The MS for all the building safety measures highlighted in the table ranged between 4.81 and 4.48, apart from burglar bars on the doors where a notable percentage of responses fell within important with a MS of 3.94. Rodriguez *et al.* (2013: 47) also highlighted the importance of building safety measures in the entire university SHFs.

#### **4.12.5 Other/general safety measures**

In Table 4.14 above, the survey requested the respondents to rank the importance of general/other safety measures the on-campus SHFs. More than 84% of the respondents also responded in the range of important and extremely important. The MS for all the general safety

measures highlighted in table ranged between 4.66 and 4.31. Apart from lawn maintenance where a notable percentage of responses fell within 'important' with a MS 4.16, all the remaining measures were ranked as 'extremely important'. Christmas (2011: 493) stressed that standard of health services have dramatically reduced in tertiary institutions and many universities have ignored the importance of health and safety measures on campus. Poor practice of student health services in higher education institutions is highlighted as an issue which need attention (Mc-Caig, 2014: 21).

#### 4.13 Risk associated with absence / lack of different measures required to ensure safety in the SHFs at university B

In this section respondents were asked to rate the level of risk associated with absence of different measures required to ensure safety in the SHFs ranking on a 5-point Likert scale where 1 = No risk, 2 = Low risk, 3 = Moderate risk, 4 = High risk and 5 = Very high risk.

Table 4.15: Risk associated with the absence / lack of different measures required to ensure safety in the SHF at university

Factor measured	Response (%)					Mean Score	Risk	
	Unsure	No risk.....Very high risk						
		1	2	3	4			5
<b>Security measures</b>								
Poor access control	0	0.6	1.2	3.0	18.9	76.3	4.69	1
Absence of security guard on post	0	0.6	0.6	6.5	16.0	76.3	4.66	2
Poor Lighting at night	0	1.2	0.6	3.6	23.1	71.6	4.63	3
Lack of fencing around the hostel	0.6	1.2	1.8	8.3	10.7	77.5	4.62	4
Absence of weapon detector at security checkpoint	0.6	0.6	0.6	15.4	10.7	72.2	4.54	5
Lack of closed-circuit television (CCTV)	1.2	0.6	1.2	10.7	27.2	59.2	4.44	6
Loose/porous security checkpoints	1.8	0.6	1.2	7.1	34.9	54.4	4.43	7
Lack of security signs	1.8	0.6	0.6	12.4	27.8	56.8	4.42	8
Absence/lack of security alarm	0.6	0.6	0.6	10.7	45.0	42.6	4.29	9
Absence of electronic coded locks on the doors	1.2	1.8	0.6	11.8	40.2	44.4	4.26	10
Lack of security patrol around the hostel	5.3	0.6	0.6	10.1	53.8	29.6	4.17	11
Lack of notice board displaying security policies	1.2	0.6	1.8	21.3	46.7	28.4	4.01	12
Lack of written policy prohibiting vandalism	1.8	1.2	0.6	23.7	52.1	20.7	3.92	13
<b>Average mean score</b>							<b>4.39</b>	

Continuation of Table 4.15.

Factor measured	Response (%)					Mean Score	Risk	
	Unsure	No risk.....Very high risk						
		1	2	3	4			5
<b>Fire safety measures</b>								
Absence of fire extinguishers	0	0	0.6	2.4	33.7	63.3	4.59	1
Lack of emergency help lines	0.6	0	0.6	0.6	39.6	58.6	4.57	2
Absence of fire alarms	0.6	0	0.6	3.0	36.7	59.2	4.55	3
Lack of emergency exit	0	0	0.6	3.6	36.1	59.8	4.55	3
Absence of smoke detectors	1.8	0	0.6	6.5	36.1	55.0	4.48	4
Faulty electrical outlets and switches	1.8	0	1.2	4.7	49.7	42.6	4.36	5
Lack of emergency protocol posters on the wall	1.2	0	0.6	10.7	42.6	45.0	4.33	6
Lack of fire hydrants	4.7	0	1.8	9.5	40.2	43.8	4.32	7
Absence of fire safety signs	0	0	0.6	10.1	46.2	43.2	4.31	8
Lack of fire assembly point	1.2	0	1.2	10.7	46.7	40.2	4.27	9
Lack of fire hose reels	3.6	0	5.3	5.3	46.2	39.6	4.24	10
Lack of evacuation fire drills	3.0	0	1.2	14.8	47.9	33.1	4.16	11
Lack of water sprinklers	1.2	0	5.9	22.5	32.5	37.9	4.03	12
Average mean score							4.37	
<b>Traffic safety measures</b>								
Absence of parking space	0	0	1.8	20.1	41.4	36.7	4.13	1
Absence of traffic signs	0	0	2.4	21.3	53.8	22.5	3.96	2
Absence of pedestrian crossing	0	0	9.5	8.3	59.8	22.5	3.95	3
Poor road to hostel	1.2	0	8.9	10.1	59.8	20.1	3.92	4
Poor vehicle access control	1.2	0	3.6	21.9	56.2	17.2	3.88	5
Lack of parking for disabled	0	0.6	0.6	36.1	39.1	23.7	3.84	6
Absence of speed bumps	0	0	3.0	33.7	40.8	22.5	3.82	7
Lack of guard for vehicle monitoring	1.2	0.6	1.8	27.8	54.4	14.2	3.80	8
Obstructed parking space	1.2	0	1.2	45.0	39.6	13.0	3.65	9
Lack of traffic lights	0	1.8	6.5	27.8	53.3	10.7	3.64	10
Lack of tags for vehicles	1.8	1.2	3.0	55.6	29.0	9.5	3.43	11
Average mean score							3.82	
<b>Building safety measures</b>								
Exposed electric wires	1.2	0	1.8	5.3	22.5	69.2	4.61	1
Broken tiles on the floor	0	0.6	3.0	7.1	27.8	61.5	4.46	2
Stairs ways not illuminated	1.8	0	1.8	13.6	27.2	55.6	4.39	3
Absence of burglar bars on the windows	0	1.2	10.1	7.7	13.6	67.5	4.36	4
Leaking showers in the hostel	0	0.6	2.4	13.6	28.4	55.0	4.34	5
Lack of disabled toilet facility	0	0	0.6	4.7	55.6	39.1	4.33	6
Absence of handrails on the stairs	1.2	0.6	3.0	11.2	33.1	50.9	4.32	7
Poor indoor ventilation	1.8	0	1.2	18.3	43.8	34.9	4.14	8
Lack of lift for disabled student	0	0	1.2	12.4	58.0	28.4	4.13	9
Evidence of crack on walls	0	1.2	3.6	26.0	21.9	47.3	4.10	10
Uncovered indoor water mains/manholes	3.0	0	0.6	23.1	47.9	25.4	4.01	11
Uncovered outdoor water mains/manholes	3.0	0	0.6	23.7	47.9	24.9	4.00	12



Continuation of Table 4.15.

Factor measured	Response (%)					Mean Score	Risk	
	Unsure	No risk.....Very high risk						
		1	2	3	4			5
<b>Building safety measures</b>								
Absence of burglar bars on doors	0	1.8	10.7	30.8	11.2	45.6	3.88	13
Peeling of plaster & paint on walls	0	0.6	3.0	37.3	43.8	15.4	3.70	14
Average mean score							4.20	
<b>Other / General safety measures</b>								
Lack of on-campus health clinic	0	0.6	1.2	2.4	15.4	80.5	4.73	1
Lack of emergency medically trained personnel on post	1.2	0	1.2	1.8	29.0	66.9	4.63	2
Unprotected excavations around the hostel	2.4	0	1.2	1.8	33.7	60.9	4.58	3
Stagnant water in/around the hostel	3.0	0	1.2	3.6	34.9	57.4	4.53	4
Lack of barricades for ongoing construction	1.8	0	1.2	16.0	13.6	67.5	4.50	5
Lack of waste bin facilities	0.6	0	1.2	4.7	40.8	52.7	4.45	6
Lack of first-aid box	1.2	0	0.6	4.1	43.8	50.3	4.45	6
Lack of waste disposal area	1.8	0	1.2	4.1	53.3	39.6	4.33	7
Lack of accident log	8.3	0	2.4	16.0	23.1	50.3	4.32	8
Poor cleaning around the hostel	0.6	0.6	0.6	13.0	43.8	41.4	4.25	9
Over grown grass around the hostel	0.6	2.4	11.2	5.3	55.0	25.4	3.90	10
Average mean score							4.42	

#### 4.13.1 Security measures

The MSs displayed in Table 4.15 indicate that respondents agreed that absence of all security measures would cause a very high risk in the SHFs. The MS obtained ranged from 4.69 and 4.17. Except for lack of notice board displaying security policies and of written policies prohibiting vandalism where the majority of responses fell within 'high risk' with a MS of 4.01 and 3.92 respectively, all the other security measures were ranked as 'very high risk'. More than 72% of the respondents responded in the range of high risk and very high risk for all the security measures. Rodriguez *et al.* (2013:42) are of the opinion that the absence of security measures in the university infrastructure could lead to theft, vandalism, crime and intimidation on campuses. Observation and the interview conducted confirmed the absence of certain security measures such as access control with functional smart card, weapon detector at the entrance of residence, and adequate CCTV in the SHFs at this university. Clearly, the university need to improve on security measures in the SHFs.

#### **4.13.2 Fire safety measures**

With regards to fire safety measures in the SHF at university B, the MS obtained as depicted in Table 4.15 were in the range of 4.59 and 4.03. The MS obtained is an indication that respondents acknowledged the risk associated with absence of fire safety measures at their residences. The majority of the responses fell within 'very high risk'. Except for lack of water sprinklers, all the other security measures were ranked as 'very high risk'. The study conducted by Hassanain (2008b: 59) also notes that lack of fire safety features in buildings is the major factor responsible for fire hazards. Similarly, Jackson *et al.* (2010: 43) observes that apart from human lifestyle and highly inflammable consumer products that can aggravate fire occurrence in buildings lack of basic fire safety measures is considered the primary risk factor. Additionally, observation and interviews conducted by the researcher revealed that some fire safety measures are lacking in the SHFs, for example water sprinkler systems. Additionally, interviews established that some firefighting equipment was in poor working condition owing to #FeesMustFall protest. The fire coordinator stated that the university was still recovering from the damage caused by the students during the protests. This calls for urgent attention from university management to improve fire safety measures in the SHFs.

#### **4.13.3 Traffic safety measures**

In Table 4.15 above, it is evident from the MS obtained that the majority of respondents perceived lack of traffic safety measures in the on-campus SHFs as a high risk. The MS obtained ranged from 4.13 for absence of parking space to 3.43 for lack of tags for vehicles. The MS obtained for the majority of respondents indicate that absence of all the traffic safety measures highlighted in the table could be of high risk in the on-campus SHFs. Similarly, Rathlagane *et al.* (2002: 25) commented that poor campus roads cause accidents. The researcher observed that traffic safety measures were comparatively better provided than security and building safety measures. Consequently, respondents were possibly influenced in terms of the risk associated with the lack of provision.

#### **4.13.4 Building safety measures**

The MS obtained shows that the majority of the respondents agreed that lack of building safety measures such as burglar bars on the windows, exposed electric wires in the hostel, broken tiles on the floor, stairways not illuminated, lack of handrails on the stairs, leaking showers in the hostel, lack of disabled toilet facilities, poor indoor ventilation, lack of lifts for disabled students, cracks on the walls, uncovered indoor and outdoor water mains/manholes would all contribute a high or very high risk to residents in the SHFs with MS ranging from 4.61 to 3.70.

Sani-Anibire and Hassanain (2015: 354) and Olanrewaju *et al.* (2010: 120) identified certain factors and conditions in SHFs with a high-risk building occupant, which include exposed electric cables, elevator failure, faulty electrical system and structural failure. These factors were also identified as possible source of risk in the SHFs by Rodriguez *et al.* (2013: 46).

#### 4.13.5 Other/general safety measures

Respondents were asked to rank the level of threat/risk they attached to absence of general safety measures in the on-campus SHFs. As depicted in Table 4.15 above, the MS obtained ranged from 4.73 and 3.90. The MS indicates that lack of any of the general safety measures, except overgrown grass around the hostels would lead to a very high risk on campus. Lack of on-campus health clinic was ranked highest by the respondents to be very high risk, while overgrown grass around the hostel was ranked as the lowest (but high risk nonetheless). However, the interview and observation revealed that although provision was made for an on-campus health clinic, the clinic did not offer 24-hour services for student. University attention is called for as emergencies that might require medical services after office hours might occur.

#### 4.14 Satisfaction with the performance / functionality of different safety measures required to in the SHFs at university B

This section presents the satisfaction level of students with different measures provided in the SHFs, ranked on a 5-point Likert scale: 1 = Extremely dissatisfied, 2 = Dissatisfied, 3 = Averagely satisfied, 4 = Satisfied and 5 = Extremely satisfied.

Table 4.16: Level of satisfaction with the performance / functionality of different measures requires to ensure SHF safety at university B

Factors measured	Response (%)					Mean Score	Rank	
	Not applicable	Extremely dissatisfied.....Extremely satisfied						
		1	2	3	4			5
<b>Security measures</b>								
Lighting at night in/around the hostel	0	1.2	3.6	11.8	23.7	59.8	4.37	1
Access control with functional smart card	1.2	4.7	1.8	8.3	29.0	55.0	4.29	2
Security guard on post	0	0.6	1.2	8.3	58.0	32.0	4.19	3
Fencing around the hostel	0	2.4	5.3	23.7	14.2	54.4	4.13	4
Security checkpoints	1.2	5.3	4.7	21.3	23.1	44.4	3.97	5
Security patrol around the hostel	1.2	0.6	8.9	16.0	42.6	30.8	3.95	6
Security signs for warning	2.4	4.7	8.9	17.8	43.2	23.1	3.72	7
Written policy prohibiting vandalism	3.6	11.2	7.1	23.7	14.8	39.6	3.66	8
Security alarm to sensitise in case of emergency	8.3	5.3	10.1	20.1	42.0	14.2	3.54	9

Continuation of Table 4.16.

Factors measured	Response (%)						Mean Score	Rank
	Not applicable	Extremely dissatisfied.....Extremely satisfied						
		1	2	3	4	5		
<b>Security measures</b>								
Notice board displaying security policies	0.6	11.8	7.7	30.8	14.2	34.9	3.52	10
Electronic coded locks on the doors at the hostel	3.6	14.8	18.9	12.4	30.2	20.1	3.22	11
CCTV for monitoring	12.4	22.5	40.2	16.0	6.5	2.4	2.15	12
Weapon detector	10.7	29.6	38.5	10.1	6.5	4.7	2.08	13
Average mean score							3.60	
<b>Fire safety measures</b>								
Fire extinguishers	0.6	1.8	1.2	12.4	63.3	20.7	4.00	1
Fire alarm	0	2.4	1.8	20.7	55.0	20.1	3.88	2
Emergency help lines	0.6	3.6	1.8	16.6	62.7	14.8	3.83	3
Fire safety signs	3.0	4.1	3.6	21.3	43.8	24.3	3.82	4
Electrical outlets and switches	8.3	1.2	2.4	20.1	55.6	12.4	3.82	4
Fire hose reels	11.2	1.8	5.9	19.5	46.7	14.8	3.75	5
Fire hydrants	6.5	1.8	3.6	20.1	60.9	7.1	3.72	6
Emergency protocol posters	1.2	3.6	4.1	24.3	53.3	13.6	3.70	7
Evacuation fire drills	10.7	4.1	11.2	17.2	46.7	10.1	3.52	8
Fire assembly point	21.3	5.3	5.3	17.2	47.9	3.0	3.48	9
Emergency exit	2.4	4.1	7.1	36.1	46.7	3.6	3.39	10
Smoke detectors	1.8	1.8	58.0	16.0	12.4	10.1	2.70	11
Water sprinkler system	9.5	4.7	62.7	13.0	7.7	2.4	2.33	12
Average mean score							3.53	
<b>Traffic safety measures</b>								
Vehicle access control	3.0	3.0	4.1	25.4	18.3	46.2	4.03	1
Traffic signs	1.2	4.1	7.7	14.8	29.6	42.6	4.00	2
Hostel road safe for vehicle	0	0.6	2.4	26.0	46.7	24.3	3.91	3
Parking space	7.1	1.8	9.5	12.4	46.7	22.5	3.84	4
Speed bumps	1.2	0.6	3.6	29.6	49.7	15.4	3.76	5
Guard for vehicle monitoring	3.0	9.5	6.5	23.1	21.3	36.7	3.71	6
Parking for disabled	2.4	3.6	10.7	24.9	37.3	21.3	3.63	7
Pedestrian crossing	1.8	0.6	1.8	63.3	22.5	10.1	3.40	8
Unobstructed parking area	1.8	0.6	3.6	66.9	13.6	13.6	3.36	9
Tags for vehicles	4.1	3.6	52.7	24.3	7.7	7.7	2.61	10
Traffic lights	4.1	20.7	55.0	13.6	4.1	2.4	2.08	11
Average mean score							3.48	

Continuation of Table 4.16.

Factors measured	Response (%)					Mean Score	Rank	
	Not applicable	Extremely dissatisfied.....Extremely satisfied						
		1	2	3	4			5
<b>Building safety measures</b>								
Burglar bars on the windows	1.2	0.6	3.6	14.2	34.9	45.6	4.22	1
Covered indoor water mains/manholes	5.3	0	1.2	14.8	40.8	37.9	4.21	2
Covered outdoor water mains/manholes	5.3	0	1.8	20.1	33.7	39.1	4.16	3
Handrails on the stairs	1.8	0	3.0	16.6	52.1	26.6	4.04	4
Electric wires protected	3.6	1.2	3.6	23.7	45.0	23.1	3.88	5
Tiles on the floor (not lifting & no cracks)	0	0	11.2	17.8	45.6	25.4	3.85	6
Stairs ways illuminated	3.0	1.2	3.0	25.4	50.9	16.6	3.81	7
Walls plastered (no cracks)	0	1.2	11.8	18.3	43.2	25.4	3.79	8
Walls painted	0.6	1.2	11.2	21.9	40.2	24.9	3.76	9
Showers (without leakage)	0.6	0.6	10.1	63.3	19.5	5.9	3.20	10
Indoor ventilation	3.0	0.6	19.5	58.6	8.9	9.5	3.07	11
Burglar bars on the doors	11.2	4.1	20.1	56.2	5.9	2.4	2.80	12
Disabled toilet facility	3.6	5.9	63.3	7.7	8.9	10.7	2.53	13
Lift for disabled students	3.6	12.4	61.5	8.9	5.9	7.7	2.32	14
Average mean score							3.33	
<b>Other / General safety measures</b>								
On-campus health clinic	0.6	1.8	4.1	8.3	16.6	68.6	4.47	1
Waste bin facilities	0.6	1.2	2.4	10.7	49.1	36.1	4.17	2
Barricades for ongoing construction	2.4	0.6	1.8	16.6	46.2	32.5	4.10	3
Cleaning around the hostel	0	0.6	0.6	23.7	40.2	34.9	4.08	4
Lawn maintenance	0	0	1.2	8.9	72.2	17.8	4.06	5
Hostel environment free from stagnant water	5.3	0.6	1.2	14.8	57.4	20.7	4.01	6
Waste disposal area	11.8	1.2	4.7	8.9	55.6	17.8	3.95	7
Protected excavations around the hostel	4.1	0.6	3.6	16.6	58.6	16.6	3.90	8
Accident log	2.4	6.5	68.0	15.4	5.3	2.4	2.27	9
First-aid box	1.8	12.4	67.5	10.1	5.9	2.4	2.16	10
Emergency medically trained personnel on post	3.6	20.7	50.9	17.8	5.3	1.8	2.13	11
Average mean score							3.57	

#### 4.14.1 Security measures

The MS obtained indicates that students were extremely satisfied with lighting at night in/around the hostel with a MS of 4.37 and access control with functional smart card with a MS of 4.29. The security services that the majority ranked as satisfied include security guard on post, fencing around the hostel, security checkpoints at the entrances of the hostel, security patrol around the SHFs, security signs for warning, written policy prohibiting vandalism,

security alarm, notice board displaying security policies as well as electronic coded locks on the doors in the hostel. However, the majority of respondents expressed a feeling of dissatisfaction with security measures such as closed-circuit television (CCTV) for monitoring in the SHFs and weapon detector at security checkpoint with MS of 2.15 and 2.08 respectively (see Table 4.16 above).

The interview and observation conducted by the researcher also established the absence and inadequacy of such security measures in the SHFs at university B. A study conducted on students' satisfaction with hostel accommodation by Oke, Aigbavboa and Raphiri (2017: 663) argued that increased performance in hostel safety features in the on-campus SHFs usually influenced overall student satisfaction. According to Bella-Omunagbe (2015: 212) overall housing satisfaction is usually affected by the users' expectation which is also in line with findings of Hassanain (2008: 47).

#### **4.14.2 Fire safety measures**

Also, Table 4.16 above presents the level of students' satisfaction with the performance/functionality of fire safety measures in the SHFs. Respondent were not extremely satisfied with any of the fire safety measures. The MS obtained indicates that respondents were however satisfied with fire safety measures such as fire assembly point, fire extinguishers, fire hose reels, electrical outlets and switches, fire safety signs, fire alarm, fire hydrants, emergency helplines, evacuation fire drills, emergency protocol posters on the wall and emergency exits (fire escape doors) with MS ranging between 4.00 and 3.39. However, respondents expressed a feeling of average satisfaction with smoke detectors with a MS of 2.70 and water sprinkler systems with a MS of 2.33. Observation and the interview conducted also established the insufficiency or lack of such measures. It was also discovered that students' lifestyle in the hostel contributes to poor performance of firefighting equipment. Oke, Aigbavboa and Raphiri (2017: 655) also acknowledged that satisfaction is strongly related to availability of facilities, and whether those facilities meet user's basic and aspirational need especially in terms of their safety and comfort at their various residences.

#### **4.14.3 Traffic safety measures**

Likewise, Table 4.16 depicts student satisfaction level with performance/functionality of traffic safety measures in the on-campus SHFs. The MS obtained indicate that the majority of the respondents expressed a feeling of satisfaction with the traffic safety measures at university B. The MS obtained ranged between 4.03 for vehicle access control, to 3.36 for unobstructed parking areas. Notwithstanding, respondents expressed a feeling of average satisfaction with the lack of tags for vehicles 2.61, and absence of traffic lights 2.08. The interview and

observation conducted by the researcher also established the lack of tags for vehicles and absence of traffic lights on campus. Eckert (2012: 350) indicates that a safe campus road, along which adequate provision is made for traffic safety features, often limits the rate of accidents on campus and influences student satisfaction.

#### **4.14.4 Building safety measures**

Table 4.16 above shows student's satisfaction level with performance/functionality of building safety measures in the SHFs. The MS obtained indicates that the majority of building safety measures fell within student satisfaction. The only building safety measures that respondents expressed a feeling of dissatisfaction with was lack of lifts for disabled students in the SHFs with a MS of 2.32. Findings further revealed that students were averagely satisfied with disabled toilet facilities in the SHFs with a MS of 2.53, showers (without leakage) with a MS of 3.20, indoor ventilation with a MS of 3.07 and burglar bars on the doors with a MS of 2.80. Observation and the interview conducted also established the evidence of cracks on the hostel walls and lack of lifts for disabled students, lack of artificial ventilation for students e.g. air conditioning. The study conducted by Rodriguez *et al.* (2013: 45) which investigates risk and protective factors in the University of South Africa also noted issues related to building safety such as broken windows, cracks on the walls, leaking showers and missing ceilings.

#### **4.14.5 Other/general safety measures**

Regarding the satisfaction of students with general safety measures in the on-campus SHFs as depicted in Table 4.16 above, the MS obtained were in the range of 4.47 and 2.13. The most satisfying general safety measures were on-campus health clinic, waste disposal area, waste bin facilities, barricades for ongoing construction, hostel environments free of stagnant water, cleaning around the hostel, lawn maintenance and protected excavations around the hostel. However, the MS obtained for accident log, first-aid box and emergency medically trained personnel on post are indicative that respondents were not satisfied. The MS obtained ranged from 2.27 and 2.13. An on-campus health clinic had the highest MS of 4.47 which indicates a level of satisfaction.

#### **4.14.6 Summary of findings for university B**

##### **4.14.6.1 Level of provision**

Generally, university B had better provision of all the measures, though, there are little safety lapses across. The average MS obtained for the level of provision of security measures (3.66) indicates that these measures are provided, though the majority of respondents perceived that

CCTV is poorly provided with a MS of 2.12 and the majority of respondents indicated that weapon detector at security checkpoint is not provided, with a MS of 1.22.

In terms of fire safety measures in the SHFs, the average MS obtained 3.79 also indicate that these measures are provided. However, the majority of respondents perceived that water sprinkler system is 'Not provided' in the SHFs with a MS of 1.63. The interview conducted also revealed the absence of a water sprinkler system in most of the residences. Apart from a water sprinkler system, the fire coordinator pointed to human factor (student lifestyle) as another point of concern which needs university attention. The officer stated that student habits such as smoking, drunkenness, use of prohibited consumer products such as unapproved electrical appliances, candles for decoration, hair dryer, open flame stove, and mishandling of firefighting equipment in the SHFs are major challenges associated with fire safety in the SHFs. The university should make effort to address those issues.

In terms of traffic safety measures in the on-campus SHFs, the average MS obtained 3.49 indicates that these measures are provided, except for tags for vehicles with a MS of 2.34 which fell within 'Poorly provided'. The respondents also rated traffic lights as not provided with MS as low as 1.25. Observation also showed that pedestrian crossings and walkways also need improvement. The university should focus on those few areas.

In terms of building safety measures, the average MS obtained 3.48 implies that these measures also fell within the 'provided' category. However, the majority of respondents responded that disabled toilet facilities are 'poorly provided' with a MS of 1.83, lifts for disabled students 'not provided' with a MS of 1.35 and burglar bars on the doors 'not provided' with a MS of 1.33. The interview and observation also confirmed that provision was made for a disabled toilet facility in few residences. Similarly, lifts for disabled students and burglar bars on the doors are not evident across the SHFs. The university should concentrate on those measures for improvement.

In terms of other/general safety measures, the average MS obtained 3.86 indicates that these measures are 'Provided', except for the provision of accident logs and an on-campus health clinic which did not offer 24-hour service for students. The university should address these few issues.

#### **4.14.6.2 Level of importance**

The average mean score obtained for all the variables implies that respondents rated all these measures as extremely important in the on-campus SHFs. The result obtained are as follow; security measures with an average MS of 4.63, fire safety measures with an average MS of 4.71, traffic safety measures with an average MS of 4.47, building safety measures with an



average of MS of 4.58 and general safety measures with an average MS of 4.45. The average MS indicates that all these measures were perceived as extremely important. The study conducted by Rodriguez *et al.* (2013: 43); Nimako and Bondinuba (2013: 134); Schwebel *et al.* (2012: 268); Mc-Caig (2014: 109); Hajrasouliha (2017:166); Oke *et al.* (2017: 652) and Nimako and Bondinuba (2019: 134) all acknowledged the importance of these measures in university infrastructure.

#### **4.14.6.3 Level of risk**

The average MS obtained for all the measures indicate that the majority of respondents agreed that absence of security measures with an average MS of 4.39, fire safety measures with an average MS of 4.37, building safety measures with an average MS of 4.20 and general safety measures with an average MS of 4.42 would contribute a 'very high risk'. However, the majority of respondents held that lack of traffic safety measures in the on-campus SHFs would only pose a 'high risk'. From the average MS obtained for all the measures, it is essential that the university endeavour to make necessary provision to avoid the risk associated with absence of the measures which are lacking. The study conducted by Rodriguez *et al.* (2013: 43) also emphasised the risk inherent in absence of safety measures on university campuses.

#### **4.14.6.4 Level of satisfaction**

The average MS obtained for students' satisfaction level with performance of security measures, fire safety measures, traffic safety measures, building safety measures and general safety measures in the SHFs varied. The overall MS obtained indicates that the majority of respondents are satisfied with performance of all the measures across the SHFs at university B. However, the individual MS of some measures did not meet the expectation of students and thus made them express a feeling of dissatisfaction. As depicted in table 4.15 above, the individual measures that did not meet the respondents' satisfaction include CCTV for monitoring with a MS of 2.15, weapon detector at security checkpoint with a MS of 2.08, smoke detectors with a MS of 2.70, water sprinkler system with a MS of 2.33, tags for vehicles with a MS of 2.16, traffic lights with a MS of 2.08, disabled toilet facility with a MS of 2.53, lift for disabled students with a MS of 2.32, accident log with a MS of 2.27, emergency medically trained personnel on post with a MS of 2.13, and first-aid box with a MS of 2.16. Improvement is therefore a priority to address the lapses in the above listed measures.

#### **4.14.7 Improvement priority areas**

A comparison between the importance and provision, the importance and satisfaction as well as the risk and provision are provided to guide the development of an improvement priority.

Table 4.17: Importance and provision relationship (university B)

Measures required to guarantee safety in the SHFs	Importance Average MS	Provision Average MS	Mean Difference
Fire safety measures in the SHFs	4.71	3.79	-0.92
Security measures in the SHFs	4.63	3.66	-0.97
Building safety measures in the SHFs	4.58	3.48	-1.01
Traffic safety measures in an on-campus SHFs	4.47	3.72	-0.75
Other/general safety measures in the SHFs	4.45	3.86	-0.59
Mean average	4.57	3.70	

Table 4.18: Importance satisfaction relationship (university B)

Measures required to guarantee safety in the SHFs	Importance Average MS	Satisfaction Average MS	Mean Difference
Fire safety measures in the SHFs	4.71	3.53	-1.18
Security measures in the SHFs	4.63	3.60	-1.03
Building safety measures in the SHFs	4.58	3.33	-1.25
Traffic safety measures in an on-campus SHFs	4.47	3.48	-0.99
Other/general safety measures in the SHFs	4.45	3.57	-0.88
Mean average	4.57	3.50	

Table 4.19: Risk and provision relationship (university B)

Measures required to guarantee safety in the SHFs	Risk. Average MS	Provision Average MS	Mean Difference
Fire safety measures in the SHFs	4.37	3.79	-0.58
Security measures in the SHFs	4.39	3.66	-0.73
Building safety measures in the SHFs	4.20	3.48	-0.72
Traffic safety measures in an on-campus SHFs	3.82	3.72	-0.01
Other/general safety measures in the SHFs	4.42	3.86	-0.56
Mean average	4.24	3.70	

Below are the measures that requires improvement both in the areas of provision and performance as they did not meet students' satisfaction. Interview and observations also confirmed inadequate provision and poor performance in some of these areas. Consequently, it is essential that the university should concentrate on these measures considering the level of importance students attached to them and the potential risk their absence/poor performance can pose to students living in the on-campus SHFs. Based on the findings, measures that require improvements in each category is provided below;

- ✦ **Security measures:** as depicted in Table 4.16, importance and provision relationship, security measures should be ranked as the third improvement priority based on the mean difference obtained. The specific measures of concern include inadequate provision of CCTV and lack of weapon detectors. The interview also revealed inadequate CCTV and absence of weapon detectors at the entrance of SHFs.
- ✦ **Fire safety measures:** as portrayed in Table 4.16 above, fire safety measures have the highest mean difference. This implies that fire safety measures require first improvement priority in the SHFs at university B. The specific measures of concern include smoke detectors and water sprinkler systems. The interview and observation confirm these lapses.
- ✦ **Building safety measures** have the second highest mean difference as depicted in Table 4.16. This indicates that building safety measures should be ranked as the second improvement priority in the SHFs at university B. The measures of concern include leaking showers in the hostel, absence of air condition to regulate indoor air and temperature, absence of burglar bars on the doors, lack of disabled toilet facility in some residence, and absence of lift for disabled students.
- ✦ **Traffic safety measures:** from Table 4.16 above, importance satisfaction relationship, the mean difference indicates that traffic safety measures required improvement priority over general safety measures. The specific area of concern includes lack of tags for vehicles and absence of traffic lights. Rodriguez et al. (2013: 45) also advocated traffic safety improvement on South Africa university campuses.
- ✦ **Other/general safety measures:** The mean score difference obtained for general safety measures in terms of importance and satisfaction that respondents attached to those measures indicate that university did well in this aspect. This implies that other/general safety measures are the lowest priority for improvement, except for few measures such as provision of an accident log, availability of emergency medically trained personnel in the SHFs, and provision of first aid-boxes.

## CHAPTER FIVE

### 5. Combined and compared analysis

#### 5.1 Introduction

This chapter presents the combined and compared analysis from both universities. The two-way ANOVA test was adopted. The two-way ANOVA is a statistical test that compares the mean differences between groups that have split on two independent variables (called factors). The primary purpose of using the two-way ANOVA test for this study was to examine variances in the group mean score (MS), and determine whether there are significant differences between the MS obtained from the universities.

#### 5.2 Level of provision of different safety measures between university A and B

The major findings are centred on level of provision of security measures, fire safety measures, traffic safety measures, building safety measures and other/general safety measures in the on-campus SHFs. Firstly, the MS of all the individual measures are compared after which the MS of the categorized measures are compared with a two-way ANOVA test. Table 5.1 below presents the MS obtained for each and every measure and their MS differences. The two-way ANOVA test used to examine whether there is a statistically significant difference in the responses from both universities regarding the level of provision of the categorized measures (combined measures) is presented in Table 5.2 and Figure 5.1 below.

It is evident in Table 5.1 that the MS differences between the security measures and fire safety measures are quite high, whilst the MS differences between traffic safety measures, building safety measures, and general safety measures are comparatively low. The test (Table 5.2 and Figure 5.1) actually confirms the level of differences. Ogee and Ellis (2015: 1) explained that when P-value is  $P > 0.05$  there is no significant difference. The result of the analysis from the two-way ANOVA test indicate that, on the one hand, there are significant differences in the security measures ( $P < 0.001$ ) and fire safety measures ( $P < 0.001$ ). On the other hand, there are no significant differences in the traffic safety measures ( $P > 0.05$ ), building safety measures ( $P > 0.05$ ), and general safety measures ( $P > 0.05$ ).

The interviews and observations support the P-values obtained. The interview and observations conducted demonstrate that university B had better provision of security and fire safety measures than university A. For example, the safety officer at university A reported the non-functionality of the CCTV due to vandalism of the university control room during the

#FeesMustFall protest. The lack of weapon detectors, absence of access control with functional smart card in some residences and inadequate provision of light at night were other issues identified. Although university B had better provision of security and fire safety measures than university A, observation and the interview revealed specific areas of lapse, such as lack of weapon detectors, inadequate provision of CCTV in the SHFs and around the campus and absence of access control with functional smart card in some residences. Issues of concern across both universities are inadequate provision/non-functionality of the CCTV, lack of weapon detectors, and electronic coded locks on the doors in the hostels. These measures were ranked in the bottom three by both groups, though with varying MS. The inadequate provision/absence of access control with functional smart card is also an area of concern for both universities. However, a few extra concerns for university A include security patrol at around the hostel and security alarm.

The most problematic factor determined in terms of fire safety measures in the SHFs at university B was the human factor. During the interview, it was indicated that though university aim to provide necessary safety and security measures on campus and in the SHFs, student lifestyle has been a major impediment. According to the safety officer, students often mishandled the firefighting equipment, and sometimes made use of open flame stoves, and smuggled in several other prohibited consumer products, which often resulted in fire-related issues. On the other hand, the safety officer at university A revealed the absence and non-functionality of some fire safety measures such as smoke detectors and water sprinkler systems. These are strongly supported by the MS obtained from both universities. The lack of water sprinkler systems was also highlighted by the safety officer at University B.

In relation to the security measures and fire safety measures, there are specific areas where improvement is required across both universities regarding the traffic safety measures, building safety measures, and general safety measures. These traffic safety measures (tags for vehicles and traffic lights); building safety measures (indoor ventilation, disabled toilet facility, burglar bars on the doors and lifts for disabled students); and general safety measures (first-aid box and emergency medically trained personnel on post) certainly need some form of attention. All these measures were rated in the bottom half by both groups, though with varying MS. The interviews and observations highlight these issues as well.

From the combined analysis of MS difference, observations, and interviews conducted; it is evident that some form of improvement is required across both institutions. Security issues concern across both universities are CCTV, lack of weapon detectors, lack of access control with functional smart card, and lack of electronic coded locks on the doors at the hostel. Fire safe issues across both universities are water sprinkler system and emergency helpline in

case of emergency situations in the SHFs. Similarly, traffic safety measures such as tags for vehicles and traffic lights; building safety measures such as indoor ventilation, disabled toilet facility, burglar bars on the doors and lifts for disabled students; and general safety measures such as first-aid box and emergency medically trained personnel on post need some form of attention in both universities. Consequently, there is need for both universities to improve the provision of those measures highlighted above.

Table 5.1: Significant difference in the level of provision between university A and B

Level of provision	University A MS	Ranking	University B MS	Ranking	Gap
<b>Security measures</b>					
Lighting at night in/around the hostel	4.02	1	4.46	2	0.44
Security guard on post	3.61	2	4.63	1	1.02
Fencing around the hostel	3.07	3	4.20	4	1.13
Security checkpoints at the entrance of the hostel	3.00	4	4.28	3	1.28
Security signs for warning	2.55	5	3.81	8	1.26
Written policy prohibiting vandalism	2.49	6	3.60	10	1.11
Notice board displaying security policies	2.04	7	3.36	11	1.32
Security patrol around the hostel	1.80	8	4.12	6	2.32
Access control with functional smart card	1.70	9	4.15	5	2.45
Security alarm to sensitise in case of emergency	1.58	10	3.98	7	2.4
Electronic coded locks on the doors at the hostel	1.54	11	3.63	9	2.09
Weapon detector at security checkpoint	1.25	12	1.22	13	-0.03
CCTV for monitoring	1.24	13	2.12	12	0.88
<b>Fire safety measures</b>					
Fire extinguishers	3.53	1	4.35	1	0.82
Fire hose reels	3.34	2	4.08	5	0.74
Fire hydrants	3.33	3	4.00	7	0.67
Electrical outlets and switches	3.31	4	4.09	4	0.78
Fire assembly point	2.56	5	3.75	10	1.19
Fire safety signs	2.51	6	4.00	8	1.49
Emergency exit (fire escape doors)	2.48	7	3.55	12	1.07
Emergency help lines	1.87	8	4.21	2	2.34
Fire alarm to sensitise in case of fire emergency	1.74	9	4.13	3	2.39
Emergency protocol posters on the wall	1.65	10	3.84	9	2.19
Water sprinkler system	1.65	11	1.63	13	-0.02
Evacuation fire drills	1.58	12	3.64	11	2.06
Smoke detectors	1.41	13	4.00	6	2.59

Continuation of Table 5.1.

Level of provision	university A MS	Ranking	university B MS	Ranking	Gap
<b>Traffic safety measures</b>					
Parking space for students and visitors	4.25	1	4.35	1	0.1
Unobstructed parking area	4.06	2	3.37	8	-0.69
Hostel road safe for vehicle use	4.05	3	4.30	2	0.25
Speed bumps	3.92	4	3.86	5	-0.06
Traffic signs	3.33	5	3.93	4	0.6
Parking for disabled	3.33	6	3.32	9	-0.01
Pedestrian crossing	3.28	7	4.30	3	1.02
Tags for vehicles	2.17	8	2.34	10	0.17
Vehicle access control	2.04	9	3.72	6	1.68
Guard for vehicle monitoring	1.59	10	3.60	7	2.01
Traffic lights	1.19	11	1.25	11	0.06
<b>Building safety measures</b>					
Handrails on the stairs	3.82	1	3.97	7	0.15
Burglar bars on the windows	3.81	2	4.38	2	0.57
Covered indoor water mains/manholes	3.46	3	4.36	3	0.9
Covered outdoor water mains/manholes	3.27	4	4.39	1	1.12
Walls painted	3.23	5	4.14	5	0.91
Stairs ways illuminated	3.19	6	3.79	8	0.6
Tiles on the floor (not lifting & no cracks)	3.08	7	4.24	4	1.16
Electric wires protected	3.01	8	4.02	6	1.01
Walls plastered (no cracks)	2.99	9	3.71	9	0.72
Showers (without leakage)	2.54	10	3.55	11	1.01
Indoor ventilation	2.08	11	3.63	10	1.55
Disabled toilet facility	1.28	12	1.83	12	0.55
Burglar bars on the doors	1.22	13	1.33	14	0.11
Lift for disabled students	1.16	14	1.35	13	0.19
<b>Other / general safety measures</b>					
On-campus health clinic	4.37	1	4.53	5	0.16
Lawn maintenance	4.00	2	4.48	6	0.48
Waste bin facilities	3.85	3	4.59	1	0.74
Waste disposal area	3.55	4	4.57	2	1.02
Cleaning around the hostel	3.42	5	4.55	4	1.13
Hostel environment free from stagnant water	3.41	6	4.45	7	1.04
Barricades for ongoing construction	3.38	7	4.55	3	1.17
Protected excavations around the hostel	3.06	8	4.43	8	1.37
Accident log	1.80	9	2.25	9	0.45
First-aid box	1.77	10	2.02	11	0.25
Emergency medically trained personnel on post	1.42	11	2.03	10	0.61

Several studies highlighted some of these lapses in the SHFs. Schwebel *et al.* (2012: 268) and Rodriguez *et al.* (2013: 47) pointed out lack of traffic safety measures such as guards to monitor vehicles, vehicle access control and traffic lights in some mega-institutions in South Africa. Additionally, Agyekum *et al.* (2016: 54) indicated that persistent increase in fire related issues in SHFs has been traced to lack/poor performance of fire safety measures. The study conducted by Sanni-Anibire and Hassanain (2015) mentioned that fire could pose a

substantial risk to life and property, thus, advocated adequate fire safety management of SHFs.

Table 5.2: Two-way ANOVA test for the level of provision

Level of provision	university A	university B	df	P value	Sum of squares	Mean square	Sig.
Security measures	2.29	3.66	1.37	P<0.01	4.187	1.047	Yes
Fire safety measures	2.38	3.79	1.41	P<0.01	27.75	27.75	Yes
Traffic safety measures	3.02	3.49	0.47	P>0.05	3.479	0.8697	ns
Building safety measures	2.72	3.48	0.76	P>0.05	104.6	0.9175	ns
General safety measures	3.09	3.86	0.77	P>0.05	3.103	0.775	ns

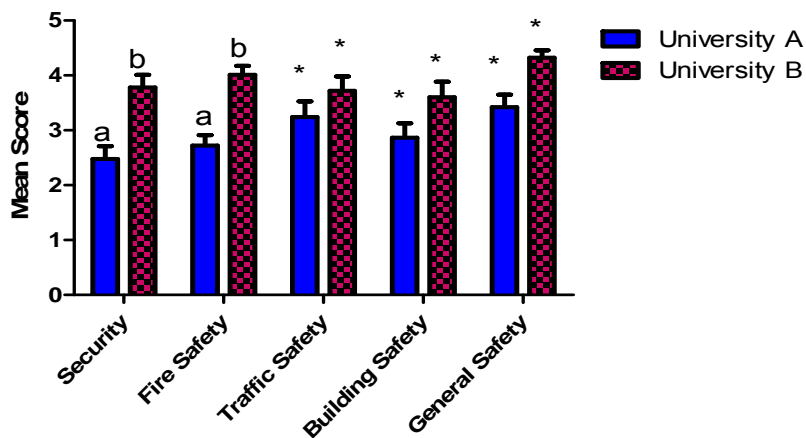


Figure 5.1: Significant different in the level of provision of different measures required to guarantee safety in the SHFs at university A and B

### 5.3 Level of importance of different safety measures between university A and B

Table 5.3 below presents differences between the MS for each and every measure in terms of level of importance from the two universities. Respondents from both universities perceived the majority of the measures (security, fire safety, traffic safety, building safety and general safety measures) as extremely important in the SHFs.

The differences in the MS reveals that students' perspectives vary regarding the level of importance they attached to these measures, although the variation between both universities is marginal. Although there are little differences in the perspective of students regarding specific measures at their various residences as shown in the MS difference in the Table 5.3, the P-value obtained for all the measures indicates there is no significant difference statistically. The P-value obtained for all these measures was less than ( $P<0.05$ ). This result indicates that the majority of the respondents from both universities agreed that security, fire



safety, traffic safety, building safety and general safety measures are extremely important to guarantee safety and security in the SHFs. The MS for the combined variables as depicted in Table 5.4 and Figure 5.2 below are all above 4.30. This indicates that students from both institutions agreed that all the measures considered in this study are essential safety measures required in the SHFs to guarantee their safety and security.

Several other studies have highlighted the importance of some of these security and safety measures. For example, the study conducted by Nimako and Bondinuba (2013: 134) and Simpeh and Akinlolu (2019) discovered that security measures in the SHFs are ranked as very important consideration by the respondents. Schwebel *et al.* (2012: 268) also observed that provision of traffic safety measure on campuses helps to prevent road accident on campus. With reference to fire safety, Chen *et al.* (2012: 312) stressed that student housing is susceptible to fire due to amount of combustible material and student lifestyle; as such, it is important that hostel providers make provision for necessary fire safety measures in the hostel. Similarly, Agyekum *et al.* (2016: 53) are of the view that the provision of fire safety measures plays an important role in ensuring the safety of student housing against fire outbreak. The importance of building safety measures in the entire university SHFs is also highlighted by Rodriguez *et al.* (2013: 47). Sanni-Anibire and Hassanain (2016: 367) emphasised that lapses in safety measures/requirements present high risk and could pose serious potential danger to the building users (students). Safety is actually a statutory consideration and therefore requires crucial attention (Husin *et al.*, 2018: 63). In setting priorities, security, safety, and environmental consideration ought to be foremost.

Table 5.3: Significant difference in the level of importance between university A and B

Level of importance	university A MS	Ranking	university B MS	Ranking	Gap
<b>Security measures</b>					
Lighting at night in/around the hostel	4.68	1	4.73	3	0.05
Security guard on post	4.68	2	4.74	2	0.06
Security alarm to sensitise in case of emergency	4.66	3	4.82	1	0.16
CCTV for monitoring	4.60	4	4.52	12	-0.08
Weapon detector	4.56	5	4.65	6	0.09
Security signs for warning	4.41	6	4.58	10	0.17
Security checkpoints at the entrance of the hostel	4.40	7	4.61	8	0.21
Access control with functional smart card	4.39	8	4.43	13	0.04
Security patrol around the hostel	4.39	9	4.62	7	0.23
Written policy prohibiting vandalism	4.37	10	4.59	9	0.22
Notice board displaying security policies	4.31	11	4.53	11	0.22
Electronic coded locks on the doors at the hostel	4.30	12	4.67	5	0.37
Fencing around the hostel	4.23	13	4.70	4	0.47

Continuation of Table 5.3

Level of importance	university A MS	Ranking	university B MS	Ranking	Gap
<b>Fire safety measures</b>					
Fire extinguishers	4.73	1	4.83	1	0.1
Fire alarm	4.72	2	4.82	3	0.1
Emergency exit (fire escape doors)	4.65	3	4.79	4	0.14
Smoke detectors	4.59	4	4.83	2	0.24
Fire hydrants	4.57	5	4.73	6	0.16
Electrical outlets and switches	4.56	6	4.63	9	0.07
Emergency help lines	4.56	7	4.76	5	0.2
Fire hose reels	4.53	8	4.65	8	0.12
Fire safety signs	4.52	9	4.72	7	0.2
Fire assembly point	4.52	10	4.59	12	0.07
Emergency protocol posters on the wall	4.50	11	4.62	10	0.12
Evacuation fire drills	4.50	12	4.59	13	0.09
Water sprinkler system	4.45	13	4.61	11	0.16
<b>Traffic safety measures</b>					
Parking for disabled	4.53	1	4.80	1	0.27
Hostel road safe for vehicle use	4.47	2	4.65	2	0.18
Parking space for students and visitors	4.46	3	4.54	5	0.08
Speed bumps	4.41	4	4.52	6	0.11
Vehicle access control	4.34	5	4.38	8	0.04
Unobstructed parking area	4.30	6	4.62	3	0.32
Pedestrian crossing	4.26	7	4.57	4	0.31
Guard for vehicle monitoring	4.26	8	4.21	10	-0.05
Traffic signs	4.17	9	4.46	7	0.29
Tags for vehicles	4.16	10	4.29	9	0.13
Traffic lights	4.01	11	4.18	11	0.17
<b>Building safety measures</b>					
Showers (without leakage)	4.70	1	4.65	4	-0.05
Lift for disabled students	4.69	2	4.81	1	0.12
Disabled toilet facility	4.68	3	4.79	3	0.11
Burglar bars on the windows	4.66	4	4.59	8	-0.07
Electric wires protected	4.63	5	4.79	2	0.16
Indoor ventilation	4.59	6	4.63	6	0.04
Handrails on the stairs	4.57	7	4.48	13	-0.09
Stairs ways illuminated	4.54	8	4.57	9	0.03
Tiles on the floor (not lifting & no cracks)	4.52	9	4.52	11	0
Walls plastered (no cracks)	4.49	10	4.64	5	0.15
Covered indoor water mains/manholes	4.42	11	4.55	10	0.13
Covered outdoor water mains/manholes	4.41	12	4.60	7	0.19
Walls painted	4.41	13	4.52	12	0.11
Burglar bars on the doors	3.97	14	3.94	14	-0.03
<b>Other / general safety measures</b>					
On-campus health clinic	4.83	1	4.66	1	-0.17
Cleaning around the hostel	4.78	2	4.52	3	-0.26
Waste disposal area	4.69	3	4.43	7	-0.26
Hostel environment free from stagnant water	4.67	4	4.44	6	-0.23
First-aid box	4.63	5	4.60	2	-0.03
Emergency medically trained personnel on post	4.63	6	4.50	4	-0.13

Continuation of Table 5.3.

Level of importance	university A MS	Ranking	university B MS	Ranking	Gap
<b>Other / general safety measures</b>					
Waste bin facilities	4.63	7	4.45	5	-0.18
Protected excavations around the hostel	4.60	8	4.31	10	-0.29
Barricades for ongoing construction	4.60	9	4.41	9	-0.19
Accident log	4.45	10	4.42	8	-0.03
Lawn maintenance	4.38	11	4.16	11	-0.22

Table 5.4: Two-way ANOVA test for the level of importance

Level of importance	university A	university B	df	P value	Sum of squares	Mean square	Sig.
Security measures	4.46	4.63	0.17	P<0.05	0.552	0.138	ns
Fire safety measures	4.57	3.79	-0.78	P>0.05	0.175	0.1751	ns
Traffic safety measures	4.31	4.47	0.16	P<0.05	0.660	0.1650	ns
Building safety measures	4.52	3.48	-1.04	P>0.05	2.578	0.0226	ns
General safety measures	4.63	4.45	-0.18	P<0.05	0.552	0.1381	ns

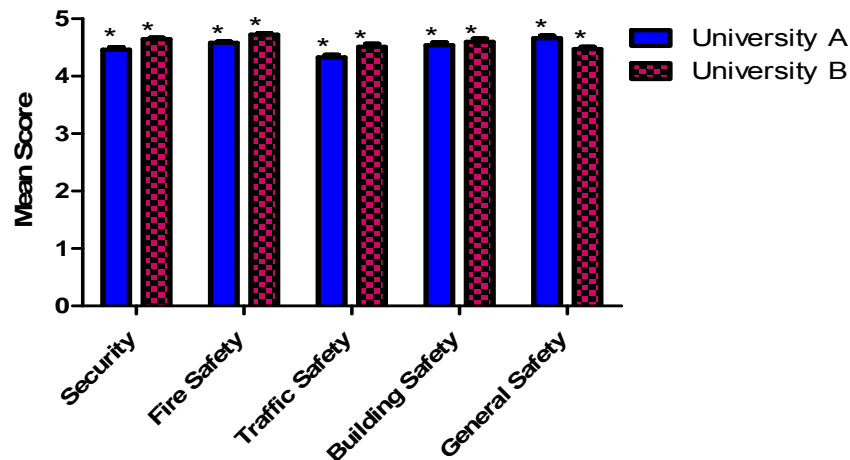


Figure 5.2: Significant difference in the level of importance students attached to different safety measures required to guarantee safety in the SHFs at university A and B

#### 5.4 Level of risk students attached to lack of safety measures between university A and B

Table 5.5 below presents the differences in the MS obtained for each measure in terms of level of risk students attached to the absence of different safety and security measures required in the on-campus SHFs between university A and B. The differences between the MS for each of the individual measures are extremely low.

Table 5.5, the P-value obtained for all the measures indicates there is no significant difference statistically. The P-value obtained for all these measures was less than ( $P < 0.05$ ). This result indicates that respondents from both universities agreed that the absence of security measures, fire safety measures, building safety measures and general safety measures present a very high risk whilst the absence of traffic safety measures present a high risk. The MS for the combined variables for these measures as depicted in Table 5.6 and Figure 5.3 are all above 4.20 except for the traffic safety measures (3.905 for university A and 3.833 for university B). Obviously, students do not see a direct effect of lack of traffic safety measures on their safety.

Interviews conducted with safety officers also confirmed the risk associated with absence of some of these measures in the on-campus SHFs across both universities. The safety officers reported that students often complain of theft in the residence, leaking showers, poor waste management in the hostel, and poor access control resulting in some male student sneaking into female residence to threaten and assault them. This is buttressed by Rodriguez *et al.* (2013: 42) who argued that the absence of such security measures in the university infrastructure could result in theft, crime and violence act.

The study conducted by Schwebel *et al.* (2012: 267) noted the risk associated with absence of traffic safety measures on campus such as accident and diverse kind of injuries, especially at peak hours. Hassanain (2008b: 59) also postulated that a lack of fire safety features in the hostel is a major factor responsible for fire hazard. Similarly, Jackson (2010: 43) commented that apart from human behaviour and consumer products that can aggravate fire occurrence in building, lack of basic fire safety measures is considered the primary source. From the combined analysis, it is evident that the majority of respondents from both universities attached a 'very high risk' to absence of all the measures except traffic safety measures which they perceived as 'high risk'. Therefore, it is essential that university should concentrate on these measures for adequate provision and effective performance.

Table 5.5: Significant difference in the level of risk between university A and B

Level of risk	university A MS	Ranking	university B MS	Ranking	Gap
<b>Security measures</b>					
Absence of security guard on post	4.55	1	4.66	2	0.11
Poor Lighting at night	4.52	2	4.63	3	0.11
Absence of weapon detector	4.48	3	4.54	5	0.06
Absence/lack of security alarm	4.37	4	4.29	9	-0.08
Poor access control	4.33	5	4.69	1	0.36
Lack of closed-circuit television (CCTV)	4.32	6	4.44	6	0.12
Lack of security patrol around the hostel	4.31	7	4.17	11	-0.14
Loose/porous security checkpoints	4.29	8	4.43	7	0.14
Absence of electronic coded locks on the doors	4.14	9	4.26	10	0.12
Lack of fencing around the hostel	4.14	10	4.62	4	0.48
Lack of security signs	4.07	11	4.42	8	0.35
Lack of written policy prohibiting vandalism	3.96	12	3.92	13	-0.04
Lack of notice board displaying security policies	3.86	13	4.01	12	0.15
<b>Fire safety measures</b>					
Lack of emergency exit	4.64	1	4.55	4	-0.09
Absence of fire extinguishers	4.59	2	4.59	1	0
Lack of emergency help lines	4.54	3	4.57	2	0.03
Absence of fire alarms	4.50	4	4.55	3	0.05
Faulty electrical outlets and switches	4.48	5	4.36	6	-0.12
Lack of fire hose reels	4.47	6	4.24	11	-0.23
Absence of smoke detectors	4.42	7	4.48	5	0.06
Lack of fire hydrants	4.40	8	4.32	8	-0.08
Lack of emergency protocol posters on the wall	4.35	9	4.33	7	-0.02
Lack of water sprinklers	4.33	10	4.03	13	-0.3
Lack of evacuation fire drills	4.31	11	4.16	12	-0.15
Lack of fire assembly point	4.29	12	4.27	10	-0.02
Absence of fire safety signs	4.15	13	4.31	9	0.16
<b>Traffic safety measures</b>					
Lack of parking for disabled	4.16	1	3.84	6	-0.32
Absence of speed bumps	4.15	2	3.82	7	-0.33
Obstructed parking space	4.05	3	3.65	9	-0.4
Absence of traffic signs	4.00	4	3.96	2	-0.04
Poor vehicle access control	3.95	5	3.88	5	-0.07
Absence of pedestrian crossing	3.91	6	3.95	3	0.04
Poor road to hostel	3.87	7	3.92	4	0.05
Lack of guard for vehicle monitoring	3.86	8	3.80	8	-0.06
Lack of tags for vehicles	3.82	9	3.43	11	-0.39
Absence of parking space	3.67	10	4.13	1	0.46
Lack of traffic lights	3.40	11	3.64	10	0.24

Continuation of Table 5.5

Level of risk	University A MS	Ranking	University B MS	Ranking	Gap
<b>Building safety measures</b>					
Exposed electric wires	4.72	1	4.61	1	-0.11
Absence of burglar bars on the windows	4.58	2	4.36	4	-0.22
Lack of lift for disabled student	4.58	3	4.13	9	-0.45
Lack of disabled toilet facility	4.45	4	4.33	6	-0.12
Absence of handrails on the stairs	4.41	5	4.32	7	-0.09
Uncovered indoor water mains/manholes	4.38	6	4.01	11	-0.37
Uncovered outdoor water mains/manholes	4.37	7	4.00	12	-0.37
Stairs ways not illuminated	4.31	8	4.39	3	0.08
Poor indoor ventilation	4.30	9	4.14	8	-0.16
Evidence of crack on walls	4.30	10	4.10	10	-0.2
Leaking showers in the hostel	4.27	11	4.34	5	0.07
Broken tiles on the floor	4.17	12	4.46	2	0.29
Absence of burglar bars on the doors	3.95	13	3.88	13	-0.07
Peeling of plasters & paint on the walls	3.93	14	3.70	14	-0.23
<b>Other / general safety measures</b>					
Lack of on-campus health clinic	4.76	1	4.73	1	-0.03
Poor cleaning around the hostel	4.57	2	4.25	10	-0.32
Lack of waste disposal area	4.56	3	4.33	8	-0.23
Lack of first-aid box	4.52	4	4.45	7	-0.07
Unprotected excavations around the hostel	4.50	5	4.58	3	0.08
Lack of emergency medically trained personnel on post	4.49	6	4.63	2	0.14
Stagnant water in/around the hostel	4.47	7	4.53	4	0.06
Lack of barricades for ongoing construction	4.45	8	4.50	5	0.05
Lack of waste bin facilities	4.28	9	4.45	6	0.17
Lack of accident log	4.22	10	4.32	9	0.1
Over grown grass around the hostel	4.15	11	3.90	11	-0.25

Table 5.6: Two way ANOVA test for the level of risk

Level of risk	university A	university B	df	P value	Sum of squares	Mean square	Sig.
Security measures	4.26	4.39	0.13	P>0.05	0.290	0.0727	ns
Fire safety measures	4.42	4.37	-0.05	P>0.05	0.0248	0.0248	ns
Traffic safety measures	3.90	3.82	-0.08	P>0.05	4.982	1.245	ns
Building safety measures	4.34	4.20	-0.14	P>0.05	4.688	0.0411	ns
General safety measures	4.45	4.42	-0.03	P>0.05	0.290	0.0727	ns

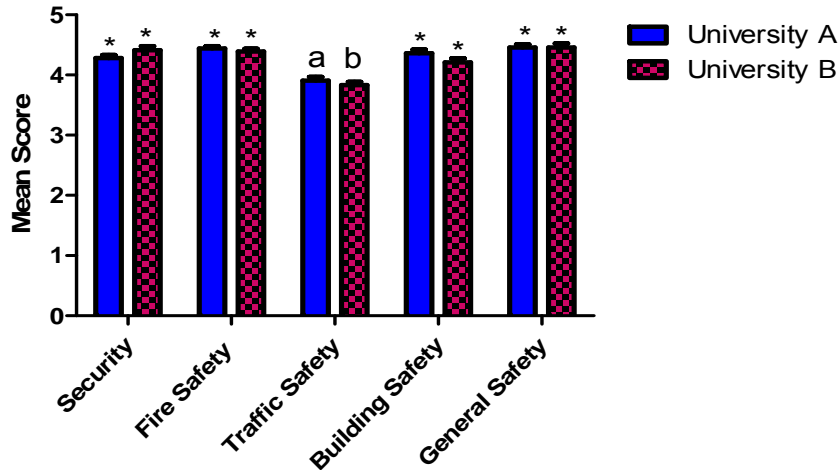


Figure 5.3: Significant different in the level of risk students attached to absence/lack of different measures required to guarantee safety in the SHFs at university A and B

### 5.5 Level of satisfaction between university A and B

As depicted in Table 5.8 and Figure 5.4 below, the two-way ANOVA test revealed a statistically significant difference with students' satisfaction level with performance of security measures, fire safety measures, and building safety measures from both universities. The P-value obtained for all these measures was less than ( $P < 0.001$ ). The result further revealed that though the responses vary in students' satisfaction level with traffic safety measures and general safety measures, the two-way ANOVA test shows that there is no statistically significant difference in students' satisfaction level for traffic safety measures and general safety measures. The P-value obtained were greater than  $P > 0.05$  (see Table 5.8).

It is deduced from the MS difference and overall MS obtained that respondents from university B are more satisfied with the performance/functionality of the security measures provided at their residences compared to the respondents from university A. It is also evident that although the satisfaction levels vary, participants in both universities were comparatively satisfied with the lighting at night in/around the hostel, fencing around the hostel and security guards on post. It is also revealing that the lowest areas of satisfaction across both universities were with CCTV for monitoring, weapon detectors at security checkpoints, security alarm, and electronic coded locks on the doors of the hostel.

The interview conducted with safety officers established some of the reasons for the poor performance of security and fire safety measures in the university SHFs, such as vandalism of major university control room as a result of #FeesMustFall protest and students' lifestyle in the hostel which includes mishandling of fire safety equipment and stealing of portable fire blankets, mostly in residences with catering/kitchen services. Safety officers also pointed to

maintenance laps as a major contributor to non-performance of some safety features and measures in the SHFs.

A study conducted by Oke, Aigbavboa and Raphiri (2017: 652) on student satisfaction with hostel accommodation in higher education institutions and student satisfaction with hostel facilities in Nigeria and a study conducted by Toyin, Patricia and Aini (2013: 306) reported that major features and measures that make students dissatisfied with university-owned accommodation include performance and effectiveness of the building safety measures and services, for example, effectiveness of the lift system, performance and functionality of electrical sockets and window quality.

The combined analysis, demonstrates that students from both universities are more satisfied with traffic safety measures compared to performance of security and fire safety measures such as smoke detectors, water sprinkler systems, CCTV, access control with functional smart card, weapon detectors at security checkpoint, security patrol around the hostel and performance of security alarm in the SHFs.

Table 5.7: Significant difference in the level of satisfaction between university A and B

Level of satisfaction	University A MS	Ranking	University B MS	Ranking	Gap
<b>Security measures</b>					
Lighting at night in/around the hostel	3.50	1	4.37	1	0.87
Fencing around the hostel	3.23	2	4.13	4	0.9
Security guard on post	3.08	3	4.19	3	1.11
Security checkpoints at the entrance of the hostel	2.57	4	3.97	5	1.4
Security signs for warning	2.50	5	3.72	7	1.22
Notice board displaying security policies	2.22	6	3.52	10	1.3
Written policy prohibiting vandalism	2.21	7	3.66	8	1.45
Access control with functional smart card	2.05	8	4.29	2	2.24
Electronic coded locks on the doors at the hostel	2.03	9	3.22	11	1.19
Security patrol around the hostel	1.96	10	3.95	6	1.99
Security alarm to sensitise in case of emergency	1.86	11	3.54	9	1.68
Weapon detector at security checkpoint	1.71	12	2.08	13	0.37
CCTV for monitoring	1.70	13	2.15	12	0.45
<b>Fire safety measures</b>					
Electrical outlets and switches	2.97	1	3.82	5	0.85
Fire hose reels	2.91	2	3.75	6	0.84
Fire hydrants	2.90	3	3.72	7	0.82
Fire extinguishers	2.82	4	4.00	1	1.18
Emergency exit (fire escape doors)	2.36	5	3.39	11	1.03
Fire safety signs	2.32	6	3.82	4	1.5
Fire assembly point	2.29	7	3.48	10	1.19
Evacuation fire drills	2.24	8	3.52	9	1.28



Continuation of Table 5.7.

Level of satisfaction	University A MS	Ranking	University B MS	Ranking	Gap
<b>Fire safety measures</b>					
Fire alarm	2.00	9	3.88	2	1.88
Emergency protocol posters on the wall	2.00	10	3.70	8	1.7
Emergency help lines	1.97	11	3.83	3	1.86
Water sprinkler system	1.88	12	2.33	13	0.45
Smoke detectors	1.77	13	2.70	12	0.93
<b>Traffic safety measures</b>					
Parking space for students and visitors	3.86	1	3.84	4	-0.02
Speed bumps	3.85	2	3.76	5	-0.09
Hostel road safe for vehicle use	3.85	3	3.91	3	0.06
Unobstructed parking area	3.76	4	3.36	9	-0.4
Traffic signs	3.64	5	4.00	2	0.36
Pedestrian crossing	3.57	6	3.40	8	-0.17
Parking for disabled	3.28	7	3.63	7	0.35
Guard for vehicle monitoring	2.69	8	3.71	6	1.02
Vehicle access control	2.61	9	4.03	1	1.42
Tags for vehicles	2.55	10	2.61	10	0.06
Traffic lights	2.28	11	2.08	11	-0.2
<b>Building safety measures</b>					
Burglar bars on the windows	3.35	1	4.22	1	0.87
Covered indoor water mains/manholes	3.31	2	4.21	2	0.9
Covered outdoor water mains/manholes	3.27	3	4.16	3	0.89
Handrails on the stairs	3.13	4	4.04	4	0.91
Stairs ways illuminated	2.87	5	3.81	7	0.94
Tiles on the floor (not lifting & no cracks)	2.80	6	3.85	6	1.05
Electric wires protected	2.79	7	3.88	5	1.09
Walls painted	2.68	8	3.76	9	1.08
Walls plastered (no cracks)	2.55	9	3.79	8	1.24
Showers (without leakage)	2.38	10	3.20	10	0.82
Indoor ventilation	2.31	11	3.07	11	0.76
Burglar bars on the doors	2.10	12	2.80	12	0.7
Disabled toilet facility	1.67	13	2.53	13	0.86
Lift for disabled students	1.57	14	2.32	14	0.75
<b>Other safety measures</b>					
On-campus health clinic	3.76	1	4.47	1	0.71
Lawn maintenance	3.66	2	4.06	5	0.4
Hostel environment free from stagnant water	3.39	3	4.01	6	0.62
Waste bin facilities	3.32	4	4.17	2	0.85
Waste disposal area	3.29	5	3.95	7	0.66
Protected excavations around the hostel	3.27	6	3.90	8	0.63
Barricades for ongoing construction	3.18	7	4.10	3	0.92
Cleaning around the hostel	3.08	8	4.08	4	1
Accident log	2.13	9	2.27	9	0.14
First-aid box	2.06	10	2.16	10	0.1
Emergency medically trained personnel on post	1.98	11	2.13	11	0.15

Table 5.8: Two-way ANOVA test for the level of satisfaction

Level of risk	university A	university B	df	P value	Sum of squares	Mean square	Sig.
Security measures	2.36	3.60	1.24	P<0.001	4.46	1.12	Yes
Fire safety measures	2.34	3.53	1.19	P<0.001	21.00	21.00	Yes
Traffic safety measures	3.27	3.48	0.21	P> 0.05	3.52	0.88	ns
Building safety measures	2.63	3.33	0.7	P<0.001	45.16	0.40	Yes
General safety measures	3.01	3.57	0.56	P> 0.05	5.35	1.338	ns

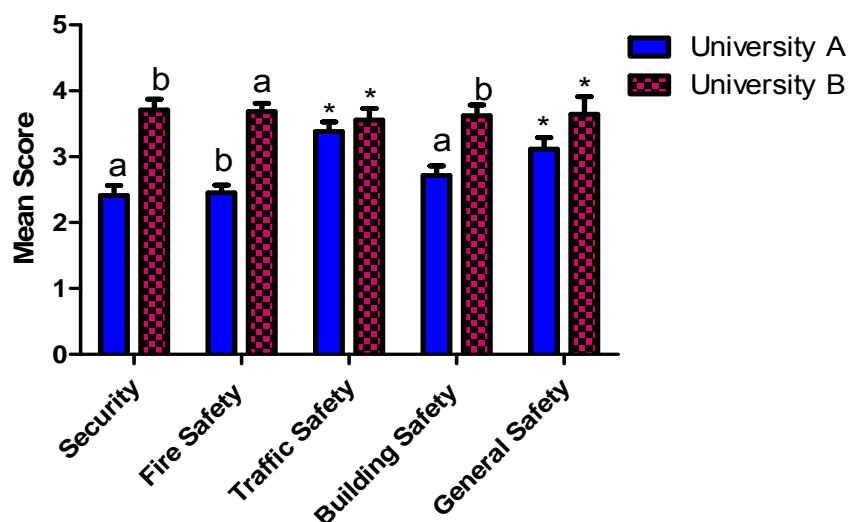


Figure 5.4: Significant difference in student's satisfaction level with performance/functionality of different measures required to guarantee safety in the SHFs at university A and B

## 5.6 Summary of findings for both universities

Below is the summary of the findings for the combined analysis.

### 5.6.1 Level of provision

Though the responses from respondents varied across both universities in terms of level of provision of security measures, fire safety measures, traffic safety measures, building safety measures and general safety measures, only security and fire safety measures were found to be significantly different statistically. Some issues across both universities were identified. Security issues of concern across both universities are CCTV, lack of weapon detectors, lack of access control with functional smart card, and lack of electronic coded locks on the doors at the hostel. Fire safe issues across both universities are water sprinkler systems and emergency helpline in case of emergency situations in the SHFs. Traffic safety measures such as tags for vehicles and traffic lights; building safety measures such as indoor ventilation,

disabled toilet facility, burglar bars on the doors and lift for disabled students; and general safety measures such as first-aid box and emergency medically trained personnel on post were some of the lapses identified in both universities.

### **5.6.2 Level of importance**

The study also found that no statistically significant difference exists in the responses from both universities in terms of the level of importance students attached to different safety and security measures required to guarantee safety in the on-campus university SHFs. Analysis of the two-way ANOVA test implies that the majority of respondents from both universities acknowledged that security, fire safety, traffic safety, building safety and general safety are all extremely important measures required to guarantee safety in the on-campus SHFs. The P-value obtained for both universities was less than 0.05.

### **5.6.3 Level of risk**

The results obtained in this chapter indicate that there is no statistically significant difference in the responses from both universities in terms of level of risk students attached to the absence of different safety and security measures required to guarantee safety in on-campus university SHFs. This implies that the majority of respondents also agreed that absence of security measures, fire safety measures, traffic safety measures, building safety measures and general safety measures could pose a very high risk to their safety in the on-campus SHFs. The P-value obtained were also less than 0.05 for the level of risk.

### **5.6.4 Level of satisfaction**

The findings show that there is a statistically significant difference in the level of student satisfaction with performance/functionality of security measures, fire safety measures, building safety measures, traffic safety measures and general safety measures from the two universities. Specifically, the result obtained from the two-way ANOVA test in terms of P-value, graph pad chat and overall mean score state that although safety and security improvement is needed in the on-campus SHFs across both universities, university B still had a better provision for security measures, fire safety measures, traffic safety measures, building safety measures and general safety measures compared to university A. Also, students from university B expressed a feeling of satisfaction regarding the performance and functionality of those measures, while students from university A expressed a feeling of dissatisfaction with provision and performance of security measures and fire safety measures. However, traffic safety measures and general safety measures fell within students' satisfaction. Building safety measures fell within the average satisfaction range at university A.

## **5.7 Chapter summary**

This chapter presented the combined and compared analysis from both universities. The two-way ANOVA test was used to analyse the data. The two-way ANOVA is a statistical test that compares the mean differences between groups that have split on two independent variables (called factors). The use of two-way ANOVA test in this chapter identifies the significant difference and gap that exists between the two universities regarding prioritisation of improvements.

## CHAPTER SIX

### 6. Summary, conclusions and recommendations

#### 6.1 Introduction

This chapter presents relevant conclusions deduced from the holistic study on the safety challenges in university SHFs. A summary of the research findings with respect to the study objectives is presented. A discussion of the contributions of the research to knowledge, the limitations of the study, and areas of further research/study are also provided.

The aim of the study was to develop a framework to improve the safety of university student housing facilities in Western Cape Province, South Africa. In order to achieve this aim, the following specific objectives were formulated:

- To examine the measures provided to ensure that the student housing facilities are safe for students.
- To determine the level of importance students attach to the different measures required to guarantee safety in SHFs.
- To assess the level of risk/threat associated with the absence or lack of the different measures required to ensure safety in SHFs, as perceived by students.
- To determine the students' level of satisfaction with the different safety measures provided in the SHFs.
- To assess the level of performance/functionality of the different safety measures provided in the SHFs.
- To develop a framework to improve the safety of university SHF in South African universities.

#### 6.2 Conclusions

##### 6.2.1 Measures provided to ensure that the SHFs are safe for students

The purpose of this objective was to aid the development of a framework to improve the safety in the SHFs by identifying safety measures that are provided and those that are lacking. The objective was met after analysis of the data collected. Five essential measures were identified from the literature reviewed which, if well provided, would guarantee safety in the on-campus SHFs. The measures identified include security measures, fire safety measures, traffic safety measures, building safety measures and general safety measures. It was discovered that both

institutions under study aim to, but did not meet 100% compliance in terms of the standards and expected norms stipulated in the National Building Regulation and Building Standards Act No 103 of 1977 of South Africa. It was established that absence of some of these measures could be a result of vandalism or failure on the part of the hostel provider (university) to procure items such as water sprinkler systems, access control with functional smart card in all residences, adequate CCTV, weapon detectors, burglar bars on doors, and 24-hour on-campus health service or clinic. Absence /lack of the above-mentioned measures in the SHFs has aggravated safety and security issues in some of the university hostels in South African higher education institutions and consequently impaired the safety of students and jeopardize their learning experience.

### **6.2.2 Level of importance students attached to the different measures required in the SHFs.**

The second objective was to determine the level of importance students attach to the different measures required to guarantee safety in SHFs and this objective was also met. The overall mean score obtained from data analysis revealed that students had varying opinion regarding the level of importance they attached to these measures. However, the variation is of no significance as all respondents from both universities perceived all the measures (security, fire safety, traffic safety, building safety, and general safety) as important and/or extremely important. The two-way ANOVA test further confirms that there was no statistically significant difference in responses across both universities. The literature reviewed also emphasised the importance of these different measures required to guarantee safety in SHFs. Any inadequacy, malfunctioning, poor performance or absence of these measures can cause a deleterious effect on the hostel occupants.

The findings also showed that respondents ranked fire safety measure as the most important, second were security measures, building safety measures were ranked third, followed by traffic safety measures on campus and finally, the general safety measures. It is worth noting that respondents ranked fire safety measures (fire alarm, fire extinguisher, emergency exit and smoke detector) as extremely important, followed by security measures (security alarm, lighting in/around the hostel, CCTV, security guard and access control with functional smart card), followed by building safety measures such as lifts for disabled students, disabled toilet facilities, shower without leakage, and burglar bars on the windows, followed by traffic safety measures (parking for disabled students or staff, pedestrian crossings, vehicle access control, hostel road save for vehicle use), followed by general safety measures (on-campus health clinics, cleaning around the hostel, first aid-box and waste disposal area). Clearly, respondent

rated the measures that have a more direct impact on their safety and security as more important than those that do not.

### **6.2.3 Level of risk/threat associated with the absence or lack of the different measures in the SHFs.**

The third objective of this study was to assess the level of risk associated with the absence of the different measures required to guarantee safety in the SHFs. This objective was also met. Respondents at both universities acknowledged that the absence of security measures, fire safety measures, traffic safety measures, building safety measures and general safety measures in the on-campus SHFs poses a very high risk to their safety in the hostel. The overall mean score obtained suggests that there is no difference in the group mean score obtained for the level of risk across both universities. Statistically, the two-way ANOVA test also compared the variances in the group mean score for the level of risk across both universities and the p values attained demonstrates no statistically significant difference, since all responses from both universities fell within high risk and very high risk.

Public health law describes nuisance as an act of omission/absence or presence of unsafe physical conditions that may cause risk, harm, injury or annoyance to the residents or occupiers. The findings revealed the omission/lack of certain safety and security measures in the SHFs at both institutions such as; absence of weapon detectors, water sprinklers, artificial ventilation, access control with functional smart card in some residence, absence/inadequate CCTV, inadequate parking space, lack of traffic lights and tags for vehicles, lack of waste recycling system and waste disposal area and inadequate lighting at night. Furthermore, it was found that certain unsafe physical conditions such as; cracks in the walls, leaking showers, malfunctioning fire safety and security measures, obstructions at the escape doors and water receptacles in/around the hostel, were present in many residences. The respondents acknowledged that absence of these safety measures could pose a very high risk to their safety and wellbeing in on-campus SHFs.

### **6.2.4 Students' level of satisfaction with the performance/functionality of different safety measures in the SHFs.**

The fourth objective was to determine students' level of satisfaction with performance /functionality of different safety measures provided in the SHFs. The objective was met and findings obtained are as follows: satisfaction level of respondents varied with performance/functionality of different safety measures provided in the SHFs in both universities. From figure 5.4, on the one hand, the two-way ANOVA test demonstrated a statistically significant difference, with student's satisfaction level with performance of security

measures, fire safety and building safety measures from both universities. On the other hand, there was no statistically significant difference in the students' satisfaction level with traffic safety measures and general safety measures. It can be deduced from the overall mean score that respondents from university B are more satisfied with performance of the different safety and security measures provided at their residences compared to respondents from university A.

It was emphasised in the literature that meeting the requirements of building users affects their satisfaction, and on the other hand, users are unsatisfied when buildings fail to meet their requirements or lack certain important safety measures. The study found that there were statistically significant differences in the responses of different residences. Generally, students across both institutions expressed a feeling of dissatisfaction with provision and performance level of safety and security measures provided at their residences. Comparatively, the students from university B were more satisfied with provision and performance of safety and security measures at their residence than students from university A.

### **6.3 Limitations**

The study was conducted within the South Africa context, focusing on student housing facilities (SHFs) and was further limited to on-campus university residences in the Western Cape Province. Two higher learning institutions were selected for the study. Also, the focus of the interviews was only on the safety and security measures required in on-campus SHFs. It was quite challenging to get respondents to participate in the study due to their tight academic schedule; this may be the reason for the high number of uncompleted questionnaires.

### **6.4 Recommendations**

#### **6.4.1 Recommendations for the universities**

Security measures, fire safety measures, traffic safety measures, building safety measures and general safety measures need to be given critical attention in the SHFs because of the danger they can pose to students. It is therefore recommended that university SHE officers, facility managers, risk and compliance departments and university maintenance departments ensure a regular safety inspection in the SHFs and regular written reports should be prepared on their findings for an immediate action as maintenance lapses may result in safety risk. Moreover, university on-campus SHFs should be well provided with

- fire safety measures which should include; fire extinguishers, fire alarm, emergency exit (fire escape doors), fire hydrants, electrical switches, smoke detectors, emergency help lines (telephone), fire hose reels, fire safety signs, fire/emergency assembly



points, emergency protocol posters on walls, regular evacuation fire drills and water sprinkler systems.

- Building safety measures which should include; lifts and toilet facilities with fitted emergency telephone for disabled students, protected electric wires, showers (without leakages), burglar bars on windows and doors, indoor ventilation (artificial and natural), illuminated stairways, well plastered walls (no cracks), covered outdoor and indoor water mains/manholes, handrails on stairs, tiles on the floor (not lifting and without cracks) and, walls well painted.
- Security measures should include; lighting at night in/around residences, fencing around residences, security guards on post (24hours service), security checkpoints at the entrances of residences, security signs for warning, noticeboards displaying security policies, written policies prohibiting vandalism, access control with functional smart card, electronic coded locks on the doors, security alarms, security patrols around the residences, CCTV for monitoring and weapon detectors at security checkpoints/entrance of residences.
- Traffic safety measures should include; parking for disabled visitors and residents, more road signs to aid road user's safety, parking space for students and visitors, speed bumps, vehicle access control, guards to monitor vehicles, unobstructed parking areas, pedestrian crossings, tags for vehicles, traffic signs and traffic lights or robots.
- General safety measures should include; on-campus health clinics (24hours), waste disposal areas, waste bin facilities, barricades during ongoing construction, residence environments free of stagnant water, cleaning around the residence, lawn maintenance, protected excavations around the residence, accident logs, emergency medically trained personnel on duty and first-aid boxes.

#### **6.4.2 Recommendations with respect to written policy for students who are registered members of SHFs and visitors.**

Student housing managers may guide students living in the residences continually with the intention of reducing ignition sources by adopting a written policy as a guideline for students to avoid dangerous acts. Such act may include; prohibition of the use of open flames, smoking in the rooms, the use of toasters, space heaters and halogen lamps in the rooms. The policy may also cover prohibition of nonchalant attitudes towards lights and other electrical appliances in the rooms and kitchen, the use and running of the electrical extension cords under carpets, drying clothing on heating units or other hot areas, and keeping curtains,

draperies, clothing, bedclothes, and free hanging decorations sufficiently far from lamps or other electrical heat sources.

#### **6.4.3 Recommendations for the facility manager/hostel administrators**

Facility managers and hostel administrators must continuously evaluate students' living spaces with the aim of reducing fuel load and ignition sources, and ensure appropriate provision of all security and safety equipment.

#### **6.5 Recommendation for further studies**

As this study concentrated on only two universities in the Western Cape Province, a broader study can be performed by considering comparative assessment of more than the two universities. Literally, it will provide a comprehensive perspective of safety and security issues that have not been addressed in this study.

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## APPENDICES

### APPENDIX A – PERMISSION LETTERS



P.O. Box 1906, Bellville 7535 South Africa,  
Tel: +27 21 959 6666 E-Mail: [greent@cput.ac.za](mailto:greent@cput.ac.za)

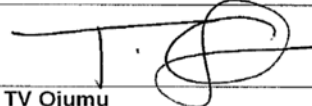
<b>FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT</b>
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On 05 February 2019, the Chairperson of the Engineering Ethics Committee of the Cape Peninsula University of Technology granted ethics approval Adisa, SO: 217020518 for research activities related to his **Master of Construction: Construction Management** studies at the Cape Peninsula University of Technology.

<b>Title of thesis:</b>	Framework to improve the safety of university student housing facilities in the Western Cape Province, South Africa
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**Comments:**

Data collection is required.

	15/02/2019
Prof TV Ojumu Assistant Dean (Acting) – Research and Innovation	Date

2019FEREC-STD-18

## APPENDIX B – INTERVIEW QUESTIONS

Faculty of Engineering,  
Department of Construction  
Management and Quantity  
Surveying.  
P.O. Box 1906,  
Bellville 7535, South Africa.

Dear Sir/Madam,

RE: PARTICIPATION IN AN INTERVIEW

You are invited to participate in an interview. The aim of the research is to develop a framework to improve the safety of SHFs in South African universities. This research study is undertaken by a Masters student towards fulfilling a Master of Construction degree in the Department of Construction Management and Quantity Surveying at Cape Peninsula University of Technology.

All information gathered from participants will be kept strictly confidential and will be solely used for academic purpose.

Thank you for your participation and support by providing necessary information towards improvement of student housing facilities safety of this great institution.

Regards.

1. What system do you have in place to generally promote campus safety?
2. What are the security measures (i.e. CCTV, security alarm etc.) put in place to ensure safety in the student housing facilities (SHFs)?
3. What are the fire safety measures (i.e. smoke detector, fire alarm etc.) put in place to guarantee fire safety in the SHFs?
4. What are the measures put in place to ensure building safety in the SHFs (i.e. burglar bars, handrails on the stairs, tiles etc.)?
5. What are the measures put in place to ensure traffic/road safety for the on campus residence (i.e. pedestrian crossing signs, speed bumps, robot etc.)?
6. What are the other/general safety measures adopted to guarantee student safety both on campus and in the SHFs (i.e. first-aid box, accident log, emergency medically trained personnel etc.)?
7. What system do you have in place in prioritising safety measures that are provided in the SHFs?

## APPENDIX C- QUESTIONNAIRE SURVEY



Faculty of Engineering,  
Department of Construction  
Management and Quantity  
Surveying.  
P.O. Box 1906,  
Bellville 7535, South Africa.

Dear Sir/Madam,

RE: PARTICIPATION IN A SURVEY

You are invited to participate in a research survey. The aim of the research is to develop a framework to improve the safety of student housing facilities (SHFs) in South African universities. This research study is undertaken by a Masters student towards fulfilling a Master of Construction degree in the Department of Construction Management and Quantity Surveying at Cape Peninsula University of Technology.

Please read all questions carefully and provide answers as honest as you could. The survey takes about 20 minutes to complete. Please indicate your response by placing an (X) or a tick (√) in the appropriate column per item.

All information gathered from participants will be kept strictly confidential and will be solely used for academic purpose. You give your consent to participate by signing the declaration by participant.

Declaration by participant: By signing below,

I name (Optional) (.....) agree to take part in this study and is aware that no compensation will be provided for participating.

Signature.....

Date.....

Please complete the survey and return to: Solomon Oluwaseun Adisa. Cape Peninsula University of Technology Email: [solomon.akinwumi@gmail.com](mailto:solomon.akinwumi@gmail.com) Cell Phone: 0628160484

**SECTION A: PROFILE OF RESPONDENT**

Please indicate your response by placing an (X) or a tick (√) in the appropriate column per item.

1.1 Kindly indicate your gender      Male       Female

1.2 Kindly indicate your level of study      Undergraduate       Post graduate

1.3 Years of living in the hostel      3years & above       2years       1year

1.4 Kindly indicate your race      Colored       Black       White

1.5 Please indicate your age group

Under 20 years	20 – 25 years	26 – 30 years	31 – 35 years	Over 36years
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION B: MEASURES PUT IN PLACE TO ENSURE STUDENT HOUSING FACILITIES (HOSTEL) SAFETY.**

2. Kindly indicate the level of provision of the following safety measures in the hostel. Rank on a 5-point Likert scale where 1 = not provided, 2 = poorly provided, 3 = somewhat provided, 4 = provided, 5 = well provided (please note the ‘unsure’ option).

SECURITY MEASURES Kindly rate the level of provision of the following security measures in/around the hostel	Level of Provision					
	Not provided	Poorly provided	Somewhat provided	Provided	Well provided	Unsure
1 Security guard on post	1	2	3	4	5	UN
2 Access control with functional smart card	1	2	3	4	5	UN
3 Closed-circuit television (CCTV) for monitoring	1	2	3	4	5	UN
4 Security checkpoints at the entrance of the hostel	1	2	3	4	5	UN
5 Security signs for warning	1	2	3	4	5	UN
6 Lighting at night in/around the hostel	1	2	3	4	5	UN
7 Fencing around the hostel	1	2	3	4	5	UN
8 Weapon detector at security checkpoint	1	2	3	4	5	UN
9 Written policy prohibiting vandalism	1	2	3	4	5	UN
10 Notice board displaying security policies	1	2	3	4	5	UN
11 Security alarm to sensitise in case of emergency	1	2	3	4	5	UN
12 Security patrol around the hostel	1	2	3	4	5	UN
13 Electronic coded locks on the doors at the hostel	1	2	3	4	5	UN



	FIRE-SAFETY MEASURES Kindly rate the level of provision of the following fire safety measures in the hostel	Not provided	Poorly provided	Somewhat provided	Provided	Well provided	Unsure
14	Fire alarm	1	2	3	4	5	UN
15	Fire extinguishers	1	2	3	4	5	UN
16	Smoke detectors	1	2	3	4	5	UN
17	Fire safety signs	1	2	3	4	5	UN
18	Evacuation fire drills	1	2	3	4	5	UN
19	Fire assembly point	1	2	3	4	5	UN
20	Electrical outlets and switches	1	2	3	4	5	UN
21	Fire hose reels	1	2	3	4	5	UN
22	Fire hydrants	1	2	3	4	5	UN
23	Water sprinkler system	1	2	3	4	5	UN
24	Emergency exit (fire escape doors)	1	2	3	4	5	UN
25	Emergency protocol posters on the wall	1	2	3	4	5	UN
26	Emergency help lines	1	2	3	4	5	UN
	TRAFFIC SAFETY MEASURES Kindly rate the level of provision of the following traffic safety measures in the hostel	Not provided	Poorly provided	Somewhat provided	Provided	Well provided	Unsure
27	Pedestrian crossing	1	2	3	4	5	UN
28	Parking space for students and visitors	1	2	3	4	5	UN
29	Hostel road safe for vehicle use	1	2	3	4	5	UN
30	Unobstructed parking area	1	2	3	4	5	UN
31	Traffic signs	1	2	3	4	5	UN
32	Speed bumps	1	2	3	4	5	UN
33	Parking for disabled	1	2	3	4	5	UN
34	Guard for vehicle monitoring	1	2	3	4	5	UN
35	Tags for vehicles	1	2	3	4	5	UN
36	Vehicle access control	1	2	3	4	5	UN
37	Traffic lights	1	2	3	4	5	UN
	BUILDING SAFETY MEASURES Kindly rate the level of provision of the following building safety measure in the hostel	Not provided	Poorly provided	Somewhat provided	Provided	Well provided	Unsure
38	Burglar bars on the windows	1	2	3	4	5	UN
39	Burglar bars on the doors	1	2	3	4	5	UN
40	Walls plastered (no cracks)	1	2	3	4	5	UN
41	Walls painted	1	2	3	4	5	UN
42	Showers (without leakage)	1	2	3	4	5	UN
43	Tiles on the floor (not lifting & no cracks)	1	2	3	4	5	UN
44	Handrails on the stairs	1	2	3	4	5	UN
45	Stairs ways illuminated	1	2	3	4	5	UN
46	Electric wires protected	1	2	3	4	5	UN
47	Lift for disabled students	1	2	3	4	5	UN
48	Disabled toilet facility	1	2	3	4	5	UN
49	Indoor ventilation	1	2	3	4	5	UN
50	Covered outdoor water mains/manholes	1	2	3	4	5	UN
51	Covered indoor water mains/manholes	1	2	3	4	5	UN

	OTHER SAFETY MEASURES Kindly rate the level of provision of the following safety measures	Not provided	Poorly provided	Somewhat provided	Provided	Well provided	Unsure
52	First-aid box	1	2	3	4	5	UN
53	Emergency medically trained personnel on post	1	2	3	4	5	UN
54	On-campus health clinic	1	2	3	4	5	UN
55	Accident log	1	2	3	4	5	UN
56	Waste bin facilities	1	2	3	4	5	UN
57	Barricades for ongoing construction	1	2	3	4	5	UN
58	Protected excavations around the hostel	1	2	3	4	5	UN
59	Hostel environment free from stagnant water	1	2	3	4	5	UN
60	Cleaning around the hostel	1	2	3	4	5	UN
61	Waste disposal area	1	2	3	4	5	UN
62	Lawn maintenance	1	2	3	4	5	UN

SECTION C: LEVEL OF IMPORTANCE OF DIFFERENT MEASURES PUT IN PLACE TO GUARANTEE SAFETY IN STUDENT HOUSING FACILITIES (HOSTEL).

3. Kindly indicate how important the following safety measures contribute in creating a safe hostel. Rank on a 5-point Likert scale where 1 = extremely not important, 2 = slightly important, 3 = averagely important, 4 = important, 5 = extremely important (please note the 'unsure' option).

SECURITY MEASURES Kindly rate the level of importance of the following security measures in the hostel		Level of Importance					Unsure
		Not at all important	Not important	Averagely important	Important	Extremely important	
1	Security guard on post	1	2	3	4	5	UN
2	Access control with functional smart card	1	2	3	4	5	UN
3	Closed-circuit television (CCTV) for monitoring	1	2	3	4	5	UN
4	Security checkpoints at the entrance of the hostel	1	2	3	4	5	UN
5	Security signs for warning	1	2	3	4	5	UN
6	Lighting at night in/around the hostel	1	2	3	4	5	UN
7	Fencing around the hostel	1	2	3	4	5	UN
8	Weapon detector at security checkpoint	1	2	3	4	5	UN
9	Written policy prohibiting vandalism	1	2	3	4	5	UN
10	Notice board displaying security policies	1	2	3	4	5	UN
11	Security alarm to sensitise in case of emergency	1	2	3	4	5	UN
12	security patrol around the hostel	1	2	3	4	5	UN
13	Electronic coded locks on the doors at the hostel	1	2	3	4	5	UN
FIRE-SAFETY MEASURES Kindly rate the level of importance of the following fire safety measures in the hostel		Not at all important	Not important	Averagely important	Important	Extremely important	Unsure

14	Fire alarm	1	2	3	4	5	UN
15	Fire extinguishers	1	2	3	4	5	UN
16	Smoke detectors	1	2	3	4	5	UN
17	Fire safety signs	1	2	3	4	5	UN
18	Evacuation fire drills	1	2	3	4	5	UN
19	Fire assembly point	1	2	3	4	5	UN
20	Electrical outlets and switches	1	2	3	4	5	UN
21	Fire hose reels	1	2	3	4	5	UN
22	Fire hydrants	1	2	3	4	5	UN
23	Water sprinkler system	1	2	3	4	5	UN
24	Emergency exit (fire escape doors)	1	2	3	4	5	UN
25	Emergency protocol posters on the wall	1	2	3	4	5	UN
26	Emergency help lines	1	2	3	4	5	UN
	TRAFFIC SAFETY MEASURES Kindly rate the level of importance of the following traffic safety measures in the hostel	Not at all important	Not important	Average important	Important	Extremely important	Unsure
27	Pedestrian crossing	1	2	3	4	5	UN
28	Parking space for students and visitors	1	2	3	4	5	UN
29	Hostel road safe for vehicle use	1	2	3	4	5	UN
30	Unobstructed parking area	1	2	3	4	5	UN
31	Traffic signs	1	2	3	4	5	UN
32	Speed bumps	1	2	3	4	5	UN
33	Parking for disabled	1	2	3	4	5	UN
34	Guard for vehicle monitoring	1	2	3	4	5	UN
35	Tags for vehicles	1	2	3	4	5	UN
36	Vehicle access control	1	2	3	4	5	UN
37	Traffic lights	1	2	3	4	5	UN
	BUILDING SAFETY MEASURES Kindly rate the level of importance of the following building safety measures in the hostel	Not at all important	Not important	Average important	Important	Extremely important	Unsure
38	Burglar bars on the windows	1	2	3	4	5	UN
39	Burglar bars on the doors	1	2	3	4	5	UN
40	Walls plastered (no cracks)	1	2	3	4	5	UN
41	Walls painted	1	2	3	4	5	UN
42	Showers (without leakage)	1	2	3	4	5	UN
43	Tiles on the floor (not lifting & no cracks)	1	2	3	4	5	UN
44	Handrails on the stairs	1	2	3	4	5	UN
45	Stairs ways illuminated	1	2	3	4	5	UN
46	Electric wire protected	1	2	3	4	5	UN
47	Lift for disabled students	1	2	3	4	5	UN
48	Disabled toilet facility	1	2	3	4	5	UN
49	Indoor ventilation	1	2	3	4	5	UN
50	Covered outdoor water mains/manholes	1	2	3	4	5	UN
51	Covered indoor water mains/manholes	1	2	3	4	5	UN
	OTHER SAFETY MEASURES Kindly rate the level of importance of the following safety measures	Not at all important	Not important	Average important	Important	Extremely important	Unsure
52	First-aid box	1	2	3	4	5	UN

53	Emergency medically trained personnel on post	1	2	3	4	5	UN
54	On-campus health clinic	1	2	3	4	5	UN
55	Accident log	1	2	3	4	5	UN
56	Waste bin facilities	1	2	3	4	5	UN
57	Barricades for ongoing construction	1	2	3	4	5	UN
58	Protected excavations around the hostel	1	2	3	4	5	UN
59	Hostel environment free from stagnant water	1	2	3	4	5	UN
60	Cleaning around the hostel	1	2	3	4	5	UN
61	Waste disposal area	1	2	3	4	5	UN
62	Lawn maintenance	1	2	3	4	5	UN

SECTION D: THREAT/RISK ASSOCIATED WITH THE ABSENCE/LACK OF DIFFERENT MEASURES REQUIRED TO ENSURE SAFETY IN STUDENT HOUSING FACILITIES (HOSTEL).

5. Kindly indicate the level of threat /risk of the absence or lack of the following safety measures in the hostel. Rank on a 5-point Likert scale which read as follows 1 = no risk, 2 = low risk, 3 = moderate risk, 4 = high risk, 5 = very high risk (please note the 'unsure' option).

SECURITY MESURES Kindly rate the level of threat/risk associated with absence of the following security measures in the hostel		Level of Threat/Risk					Unsure
		No risk	Low risk	Moderate risk	High risk	Very high risk	
1	Absence of security guard on post	1	2	3	4	5	UN
2	Poor access control	1	2	3	4	5	UN
3	Lack of closed-circuit television (CCTV)	1	2	3	4	5	UN
4	Loose/porous security checkpoints	1	2	3	4	5	UN
5	Lack of security signs	1	2	3	4	5	UN
6	Poor lighting at night	1	2	3	4	5	UN
7	Lack of fencing around the hostel	1	2	3	4	5	UN
8	Absence of weapon detector at security checkpoint	1	2	3	4	5	UN
9	Lack of written policy prohibiting vandalism	1	2	3	4	5	UN
10	Lack of notice board displaying security policies	1	2	3	4	5	UN
11	Absence/lack of security alarm	1	2	3	4	5	UN
12	Lack of security patrol around the hostel	1	2	3	4	5	UN
13	Absence of electronic coded locks on the doors	1	2	3	4	5	UN
FIRE-SAFETY MEASURES Kindly rate the level of threat/risk associated with absence of the following fire-safety measures		No risk	Low risk	Moderate risk	High risk	Very high risk	Unsure
14	Absence of fire alarms	1	2	3	4	5	UN
15	Absence of fire extinguishers	1	2	3	4	5	UN
16	Absence of smoke detectors	1	2	3	4	5	UN
17	Absence of safety signs	1	2	3	4	5	UN
18	Lack of evacuation fire drills	1	2	3	4	5	UN
19	Absence/lack of fire assembly point	1	2	3	4	5	UN
20	Faulty electrical outlets and switches	1	2	3	4	5	UN
21	Lack of fire hose reels	1	2	3	4	5	UN
22	Lack of fire hydrants	1	2	3	4	5	UN

23	Absence/lack of water sprinkler system	1	2	3	4	5	UN
24	Lack of emergency exit	1	2	3	4	5	UN
25	Lack of emergency protocol posters on the wall	1	2	3	4	5	UN
26	Absence of emergency help lines	1	2	3	4	5	UN
	<b>TRAFFIC SAFETY MEASURES</b> Kindly rate the level of threat/risk associated with absence of the following traffic safety measures	No risk	Low risk	Moderate risk	High risk	Very high risk	Unsure
27	Absence of pedestrian crossing	1	2	3	4	5	UN
28	Absence of parking space	1	2	3	4	5	UN
29	Poor road to hostel	1	2	3	4	5	UN
30	Obstructed parking space	1	2	3	4	5	UN
31	Absence of traffic signs	1	2	3	4	5	UN
32	Absence of speed bumps	1	2	3	4	5	UN
33	Absence of parking space for disabled	1	2	3	4	5	UN
34	Lack of guard for vehicle monitoring	1	2	3	4	5	UN
35	Lack of tags for vehicles	1	2	3	4	5	UN
36	Poor vehicle access control	1	2	3	4	5	UN
37	Absence of traffic lights	1	2	3	4	5	UN
	<b>BUILDING SAFETY MEASURES</b> Kindly rate the level of threat/risk associated with absence of the following building safety measures	No risk	Low risk	Moderate risk	High risk	Very high risk	Unsure
38	Absence of burglar bars on the windows	1	2	3	4	5	UN
39	Absence of burglar bars on the doors	1	2	3	4	5	UN
40	Evidence of crack on the walls	1	2	3	4	5	UN
41	Peeling of plaster & paint on the walls	1	2	3	4	5	UN
42	Leaking showers in the hostel	1	2	3	4	5	UN
43	Broken tiles on the floor	1	2	3	4	5	UN
44	Absence of handrails on the stairs	1	2	3	4	5	UN
45	Stairs ways not illuminated	1	2	3	4	5	UN
46	Exposed electric wire	1	2	3	4	5	UN
47	Absence/lack of lift for disabled students	1	2	3	4	5	UN
48	Lack of disabled toilet facility	1	2	3	4	5	UN
49	Poor indoor ventilation	1	2	3	4	5	UN
50	Uncovered outdoor water mains/manholes	1	2	3	4	5	UN
51	Uncovered indoor water mains/manholes	1	2	3	4	5	UN
	<b>OTHER SAFETY MEASURES</b> Kindly rate the level of threat/risk associated with absence of the following safety measures	No risk	Low risk	Moderate risk	High risk	Very high risk	Unsure
52	Absence/lack of first-aid box	1	2	3	4	5	UN
53	Lack of emergency medically trained personnel on post	1	2	3	4	5	UN
54	Lack of on-campus health clinic	1	2	3	4	5	UN
55	Lack of accident log	1	2	3	4	5	UN
56	Lack of waste bin facilities	1	2	3	4	5	UN
57	Lack of barricades for ongoing construction	1	2	3	4	5	UN
58	Unprotected excavations around the hostel	1	2	3	4	5	UN
59	Stagnant water in/around the hostel	1	2	3	4	5	UN
60	Poor cleaning around the hostel	1	2	3	4	5	UN
61	Absence/lack of waste disposal area	1	2	3	4	5	UN
62	Over grown grass around the hostel	1	2	3	4	5	UN

SECTION E: SATISFACTION WITH THE PERFORMANCE/FUNCTIONALITY OF DIFFERENT MEASURES PUT IN PLACE TO ENSURE STUDENT HOUSING FACILITIES (HOSTEL) SAFETY.

4. Kindly indicate the level of your satisfaction with the performance/functionality of the following safety measures in the hostel. Rank on a 5-point Likert scale which read as follows 1 = extremely dissatisfied, 2 = dissatisfied, 3 = averagely dissatisfied, 4 = satisfied, 5 = extremely satisfied (please note the not applicable option).

SECURITY MEASURES Kindly rate the level of your satisfaction with the following security measures in the hostel		Level of Satisfaction					Not applicable
		Extremely dissatisfied	Dissatisfied	Averagely satisfied	Satisfied	Extremely satisfied	
1	Security guard on post	1	2	3	4	5	NA
2	Access control with functional smart card	1	2	3	4	5	NA
3	Closed-circuit television (CCTV) for monitoring	1	2	3	4	5	NA
4	Security checkpoints at the entrance of the hostel	1	2	3	4	5	NA
5	Security signs for warning	1	2	3	4	5	NA
6	Lighting at night in/around the hostel	1	2	3	4	5	NA
7	Fencing around the hostel	1	2	3	4	5	NA
8	Weapon detector at security checkpoint	1	2	3	4	5	NA
9	Written policy prohibiting vandalism	1	2	3	4	5	NA
10	Notice board displaying security policies	1	2	3	4	5	NA
11	Security alarm to sensitise in case of emergency	1	2	3	4	5	NA
12	security patrol around the hostel	1	2	3	4	5	NA
13	Electronic coded locks on the doors at the hostel	1	2	3	4	5	NA
FIRE-SAFETY MEASURES Kindly rate the level of your satisfaction with the following fire-safety measures in the hostel		Extremely dissatisfied	Dissatisfied	Averagely satisfied	Satisfied	Extremely satisfied	Not applicable
14	Fire alarm	1	2	3	4	5	NA
15	Fire extinguishers	1	2	3	4	5	NA
16	Smoke detectors	1	2	3	4	5	NA
17	Fire safety signs	1	2	3	4	5	NA
18	Evacuation fire drills	1	2	3	4	5	NA
19	Fire assembly point	1	2	3	4	5	NA
20	Electrical outlets and switches	1	2	3	4	5	NA
21	Fire hose reels	1	2	3	4	5	NA
22	Fire hydrants	1	2	3	4	5	NA
23	Water sprinkler system	1	2	3	4	5	NA
24	Emergency exit (fire escape doors)	1	2	3	4	5	NA
25	Emergency protocol posters on the wall	1	2	3	4	5	NA
26	Emergency help lines	1	2	3	4	5	NA

	TRAFFIC SAFETY MEASURES Kindly rate the level of your satisfaction with the following traffic safety measures in the hostel	Extremely dissatisfied	Dissatisfied	Averagely satisfied	Satisfied	Extremely satisfied	Not applicable
27	Pedestrian crossing	1	2	3	4	5	NA
28	Parking space for students and visitors	1	2	3	4	5	NA
29	Hostel road safe for vehicle use	1	2	3	4	5	NA
30	Unobstructed parking area	1	2	3	4	5	NA
31	Traffic signs	1	2	3	4	5	NA
32	Speed bumps	1	2	3	4	5	NA
33	Parking for disabled	1	2	3	4	5	NA
34	Guard for vehicle monitoring	1	2	3	4	5	NA
35	Tags for vehicles	1	2	3	4	5	NA
36	Vehicle access control	1	2	3	4	5	NA
37	Traffic lights	1	2	3	4	5	NA
	BUILDING SAFETY MEASURES Kindly rate the level of your satisfaction with the following building safety measures in the hostel	Extremely dissatisfied	Dissatisfied	Averagely satisfied	Satisfied	Extremely satisfied	Not applicable
38	Burglar bars on the windows	1	2	3	4	5	NA
39	Burglar bars on the doors	1	2	3	4	5	NA
40	Walls well plastered (no cracks)	1	2	3	4	5	NA
41	Walls well painted	1	2	3	4	5	NA
42	Showers (without leakage)	1	2	3	4	5	NA
43	Tiles on the floor (not lifting & no cracks)	1	2	3	4	5	NA
44	Handrails on the stairs	1	2	3	4	5	NA
45	Stairs ways illuminated	1	2	3	4	5	NA
46	Electric wire protected	1	2	3	4	5	NA
47	Lift for disabled students	1	2	3	4	5	NA
48	Disabled toilet facility	1	2	3	4	5	NA
49	Indoor ventilation	1	2	3	4	5	NA
50	Covered outdoor water mains/manholes	1	2	3	4	5	NA
51	Covered indoor water mains/manholes						
	OTHER SAFETY MEASURES Kindly rate the level of your satisfaction with the following safety measures	Extremely dissatisfied	Dissatisfied	Averagely satisfied	Satisfied	Extremely satisfied	Not applicable
52	First-aid box	1	2	3	4	5	NA
53	Emergency medically trained personnel on post	1	2	3	4	5	NA
54	On-campus health clinic	1	2	3	4	5	NA
55	Accident log	1	2	3	4	5	NA
56	Waste bin facilities	1	2	3	4	5	NA
57	Barricades for ongoing construction	1	2	3	4	5	NA
58	Protected excavations around the hostel	1	2	3	4	5	NA
59	Hostel environment free from stagnant water	1	2	3	4	5	NA
60	Cleaning around the hostel	1	2	3	4	5	NA
61	Waste disposal area	1	2	3	4	5	NA
62	Lawn maintenance	1	2	3	4	5	NA

APPENDIX D – OBSERVATION CHECKLIST

SECURITY MEASURES		OBSERVATION
1	Security guard on post	
2	Access control with functional smart card	
3	Closed-circuit television (CCTV) for monitoring	
4	Security checkpoints at the entrance of the hostel	
5	Security signs for warning	
6	Lighting at night in/around the hostel	
7	Fencing around the hostel	
8	Weapon detector at security checkpoint	
9	Written policy prohibiting vandalism	
10	Notice board displaying security policies	
11	Security alarm to sensitise in case of emergency	
12	Security patrol around the hostel	
13	Electronic coded locks on the doors at the hostel	
	FIRE-SAFETY MEASURES	
14	Fire alarm	
15	Fire extinguishers	
16	Smoke detectors	
17	Fire safety signs	
18	Evacuation fire drills	
19	Fire assembly point	
20	Electrical outlets and switches	
21	Fire hose reels	
22	Fire hydrants	
23	Water sprinkler system	
24	Emergency exit (fire escape doors)	
25	Emergency protocol posters on the wall	
26	Emergency help lines	
	TRAFFIC SAFETY MEASURES	
27	Pedestrian crossing	
28	Parking space for students and visitors	
29	Hostel road safe for vehicle use	
30	Unobstructed parking area	
31	Traffic signs	
32	Speed bumps	
33	Parking for disabled	
34	Guard for vehicle monitoring	
35	Tags for vehicles	
36	Vehicle access control	
37	Traffic lights	
	BUILDING SAFETY MEASURES	
38	Burglar bars on the windows	
39	Burglar bars on the doors	



40	Walls plastered (no cracks)	
41	Walls painted	
42	Showers (without leakage)	
43	Tiles on the floor (not lifting & no cracks)	
44	Handrails on the stairs	
45	Stairs ways illuminated	
46	Electric wires protected	
47	Lift for disabled students	
48	Disabled toilet facility	
49	Indoor ventilation	
50	Covered outdoor water mains/manholes	
51	Covered indoor water mains/manholes	
	OTHER SAFETY MEASURES	
52	First-aid box	
53	Emergency medically trained personnel on post	
54	On-campus health clinic	
55	Accident log	
56	Waste bin facilities	
57	Barricades for ongoing construction	
58	Protected excavations around the hostel	
59	Hostel environment free from stagnant water	
60	Cleaning around the hostel	
61	Waste disposal area	
62	Lawn maintenance	